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INSTALLATION RESTORATION PROGRAM
PHASE II - CONFIRMATION/QUANTIFICATION
STAGE 2

DULUTH INTERNATIONAL AIRPORT DULUTH, MINNESOTA 55811

DAMES & MOORE 1550 NORTHWEST HIGHWAY PARK RIDGE, ILLINOIS 60068

MAY 26, 1988

APPENDIX (28 OCTOBER 1986 TO 13 JANUARY 1987)

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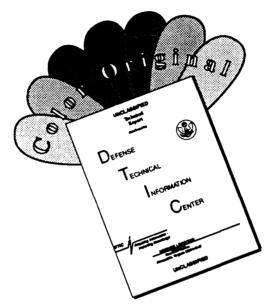
PREPARED FOR AIR NATIONAL GUARD ANDREWS AFB, MD 20331-6008

UNITED STATES AIR FORCE
OCCUPATIONAL & ENVIRONMENTAL HEALTH LABORATORY (USAFOEHL)
TECHNICAL SERVICES DIVISION (TS)
BROOKS AIR FORCE BASE, TEXAS 78235-5501



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APPENDIX A

DEFINITIONS, NOMENCLATURE, AND UNITS OF MEASUREMENT

ANG

Air National Guard

ASTM

American Society for Testing and Materials

Aquifer

zone beneath the earth's surface capable of

producing water for a well.

BGS

Below Ground Surface

BOG

A waterlogged area of land, covered by spongy groundmass containing acidic, decaying vegetation which may develop into peat.

CERCLA

Comprehensive Environmental Response Compensation and Liability Act of 1980

cm/s

centimeters per second

DDD

pesticide compound syn: 1,dichloroethane or TDE. Similar to DDT.

DEOPPM

Defense Environmental Quality Program Policy Memorandum

Deranged Drainage

a distinctively disordered drainage pattern in a recently glaciated area whose former surface and preglacial drainage has been remodeled and effaced, and in which the new drainage system shows a complete lack of underlying structural and bedrock control. It is characterized by irregular streams that flow in and out of lakes, by only a few short tributaries, and by swampy interstream areas.

DPDO

Defense Property Disposal Office

DoD

Department of Defense

Duluth IAP

Duluth International Airport

ground water divide

a line on the water table on each side of which the ground water table slopes away from the line.

ground water surface

the level below which the earth is saturated.

GABBRO

a group of dark-colored, basic intrusive igneous rocks.

HARM

Hazard Assessment Rating Methodology. A numerical scoring system used to evaluate potentially contaminated sites. The system takes into account site and waste characteristics, pathways of migration, and potential receptors of contamination. The HARM system is used to indicate the relative need for follow-up action.

hydraulic gradient

change in pressure or head in the ground water over a given distance of flow

Intrusive Igneous Rocks

Rock of molten origin that has been injected into existing rock and solidified without reaching the ground surface.

TRP

Installation Restoration Program

Kame

a steep-sided hill or ridge, composed chiefly of poorly sorted and stratified sand and gravel deposited by a subglacial stream as a delta against or upon the terminal margin of a melting glacier.

Lopolith

a large, lens-shaped igneous intrusion.

Marsh

a water-saturated, poorly drained area, intermittently or permanently water-covered, having aquatic and grasslike vegetation, essentially without peatlike accumulation.

uq/1

micrograms per liter (equivalent to parts per billion in water).

umho/cm

micromhos per centimeter (units of Specific Conductance).

ug/g

Micrograms per gram (equivalent to parts per million in water).

ug/kg

Micrograms per kilogram (equivalent to parts per billion in water).

ma/1

milligrams per liter (equivalent to parts per million in water).

million gallons per day

mgd

Moraine a distinct accumulation of unsorted, unstratified

glacial drift, predominantly till, deposited

chiefly by direct action of glacier ice.

MSL Mean Sea Level Datum

Outwash stratified sand and gravel removed from a glacier

by meltwater streams.

pH negative logarithm of the hydrogen ion concentra-

tion in water.

PCB Polychlorinated Biphenyls

ppb parts per billion (equivalent to ug/l in water).

ppm parts per million (equivalent to mg/l in water).

Syncline a fold in layers of rock that is concave upward.

Swamp a water-saturated area, intermittently or perma-

nently covered with water, having shrub- and treetype vegetation, essentially without peatlike

accumulation.

TOC Total Organic Carbon

TOX Total Organic Halogens, which are organic com-

pounds containing any of the elements of Group

VII-b of the Periodic Table (F, Cl, Br, I).

Unconsolidated Sediments sediments that are uncemented and thus contain

interconnected void space (primary porosity) that allow for the storage and transmission of ground

water.

USAF United States Air Force

USAF/OEHL Occupational and Environmental Health Laboratory

USEPA United States Environmental Protection Agency

USGS United States Geological Survey

VOA Volatile Organic Compounds

APPENDIX B
STATEMENT OF WORK

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REPRESENTS NET AMOUNT OF INCREASE/DECREASE WHEN MODIFYING EXISTING ITEM-NO. N = NOT APPLICABLE
U = UNDEPRINITIZED
NSP = NOT SEPARATELY PRICED

AFSC FORM 705

= ESTIMATED

- (IN GTY AND \$) = DECEBASE

+ OR - (IN ITEM NO.) = ADDITION OR DELETION

CHR: CONTROLLED ITEM RPT ROMT

PREVIOUS EDITION WILL BE USED,

SITE D = DESTINATION CODES: O = INTERMEDIATE

AFSC-Andrews AFB Md 1980

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E= ESTMATED
- (IN QTY AND S)= DECREASE
+ OR - (IN ITEM NO.) = ADDITION OR DELETION
CIRR: CONTROLLED ITEM RPT RGMT

S = SOURCE D = DESTINATION CODES: O = INTERMEDIATE

Installation Restoration Program Phase II - Stage 2 Duluth International Airport Minnesota

I. DESCRIPTION OF WORK

The objective of IRP Phase II investigations is to identify contaminants and then define the magnitude, extent, direction and rate of movement of identified contaminants. A series of staged field studies may be required to meet this objective.

The Phase II Stage 2 effort at Duluth IAP will entail a follow-on investigation for five sites evaluated during Phase II, Stage 1, and an initial monitoring program at six additional sites. The sites which are included in this study are identified in Table 1 and can be located on an installation map, Figure 1. The sites to receive follow-on investigative work are Goose Dump 1, Fire Training Areas, DPDO Storage Area "C" and the Tank Farm Area.

The purpose of this effort at Duluth IAP is to: (1) confirm the presence - absence of contamination within the specifed areas of investigation; (2) contamination exists, determine the magnitude of contamination, and the potential for and rate of migration of those contaminants in the various environmental media; (3) identify potential environmental and health risk consequences of migrating pollutants; and (4) recommend additional investigations necessary to further define the magnitude, extent, direction and rate of contaminant migration.

The Phase I and the Phase II Stage 1 IRP Reports (mailed under separate cover) incorporate the background and description of the sites included in this task. To accomplish this survey effort, take the following actions:

A. Ceneral

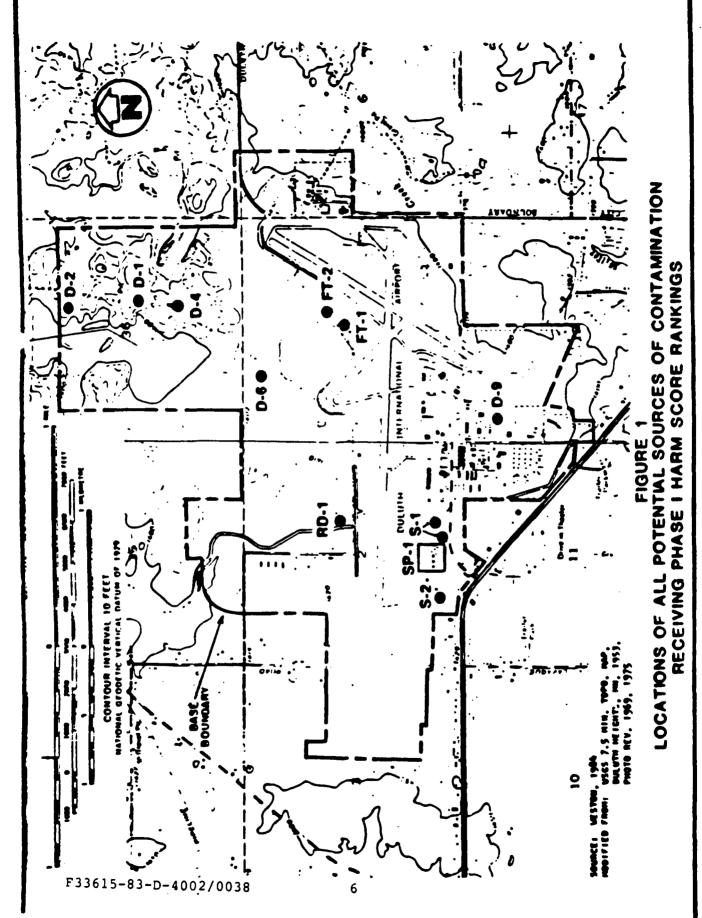
- 1. Monitor all borehole and well drilling with a photoionization meter or equivalent organic vapor detector to identify the potential generation of hazardous and/or toxic vapors or gases. Include air monitoring results in the boring logs. If soil encountered during drilling or test pit work is suspected to be hazardous because of discoloration, odor or air monitoring, containerize the soil cuttings in new, unused drums. Enter into the boring logs the depth(s) from which suspected contaminated soil cuttings were collected. Test each drum containing suspected contaminated soils by taking a composite sample. Collect a maximum of 15 composite samples and test them for EP Toxicity and Ignitibility. (Ref: 40 CFR Subpart C., 261.21 Ignitibility and 261.24 EP Toxicity).
- 2. Determine the exact field location of all boreholes and monitor wells during the planning/mobilization phase of the field investigation. Consult with base personnel to minimize disruption of base activities, to properly position boreholes with respect to exact locations of spill/leak sites, and to avoid underground utilities. The senior on-site contract representative, in consultation with the USAF OEHL project manager and the base point-of-contact (see Section V), establishes the final borehole and well locations. Direct all drilling and sampling operations and maintain a detailed log of the conditions and materials penetrated during the course of the work.

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TABLE 1 LISTING OF SITES

SITE NO.	PHASE I NO.	SITE DESCRIPTION
1	D-1 (TAC)	Goose Dump 1
2	FT-1 and FT-2 (ANG)	Fire Training Areas
3	S-2 (ANG)	DPDO Storage Area "C"
4	SP-1 (ANG)	Tank Farm Area
5	D-4 (TAC)	South Goose Dump
6	D-2 (TAC)	Goose Dump 2
7	D-6 (TAC)	Runway 13 NE Disposal
8	S-1 (ANG)	Old DPDO Storage Area
9	D-9 (TAC)	Disposal Pit
10	RD-1 (ANG)	Low-Level Radioactive Waste Disposal

NOTE: ANG: Air National Guard sites
TAC: Tactical Air Command sites



- 3. Provide on site analysis of pH, temperature, and specific conductance for all water samples collected. Comply with the following references concerning sample collection, maximum holding time, sample preservation, etc: Standard Methods for the Examination of Water and Wastewater, 16th Ed. (1985), pp. 37-44; ASTM, Section 11, Water and Environmental Technology; Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057; Methods for Chemical Analysis of Waters and Wastes, EPA Manual 600/4-79-020, pp. xiii to xix (1983); and Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 2nd Ed. (USEPA, 1984). Meet the required detection limits of the applicable EPA method identified in Table 4 for all water and soil chemical analyses.
 - 4. Determine the areal extent of the sites by reviewing available aerial photos of the base, both historical and the most recent panchromatic and infrared. Report the sources of this data.
 - 5. Split all water and soil samples. One set of samples shall be analyzed by the contractor and the other set of samples shall be delivered immediately (the same collection day) to the field government Point Of Contact (POC). The field POC will select 10% of the split samples for subsequent shipment and analysis and deliver them to the contractor within 4 hours of receipt. The contractor shall supply all packing and shipping materials for the field POC's use in packaging the split samples. The contractor shall accept from the field POC the packaged samples for immediate shipment (within 24 hours) for analysis through overnight delivery to:

USAFOEHL/SA Bldg 140 Brooks AFB TX 78235-5501

Include the following information with samples sent to the USAF OEHL:

- a. Purpose of sample (analyte)
- b. Installation name (Base)
- c. Sample number (on container)
- d. Source/location of sample
- e. Contract Task Numbers and Title of Project
- f. Method of collection (bailer, suction pump, air-lift pump, etc)
- g. Volumes removed before sample taken
- h. Special Conditions (use of surrogate standard, etc.)
- i. Preservatives used (indicate if nonstandard)
- j. Date and time of sampling
- k. Sampler's name

Forward this information with each sample by properly completing an AF

orm 2752A "Environmental Sampling Data" and/or AF Form 2752B "Environmental ampling Data-Trace Organics," mailed under separate cover. Label each sample container to reflect the data in (a), (b), (c), (i), (j), and (k) above. In addition, attach copies of field logs which document sample collection.

Complete and maintain chain-of-custody records for all samples, field blanks, and quality control duplicates.

- 6. Install groundwater monitor wells using the following specifications:
- a. Comply with the U.S. EPA Publication 330/9-S1-002, NEIC Manual for Ground Water /Subsurface Investigations at Hazardous Waste Sites for monitor well installation. Also comply with state and local regulatory agency requirements concerning well drilling, development and purging, and groundwater sampling methods.
- b. Drill each well using conventional hollow-stem auger techniques. Where refusal is encountered due to boulders before the required well completion depth is achieved, use diamond core drilling to complete the borehole. Take samples for stratigraphic description and logging at five-foot intervals using standard split spoon techniques. I dude each pilot boring log and well completion summary in the Final Report (as specified in Item VI below).
- c. Collect soil samples for laboratory analysis from well boreholes as directed in section B. Where the depths and/or boreholes from which soil samples should be collected at a site are not specified in Section B, actual sample locations (borehole and depth) are at the field supervisor's discretion; however, samples should be limited to areas of suspected contamination. At sites where soil samples are specified in Section B to be collected from designated boreholes and at certain depths, variations may occur at the field supervisors discretion to ensure zones of suspected contamination are sampled. Do not collect or analyze more soil samples than authorized in Section B.
- d. Install wells at a sufficient depth to collect samples representative of aquifer quality and to intercept floating contaminants. It is velop each well as soon as practical after completion by surging with an air-lift pump or bailer. Do not introduce foreign materials into the well during development. Continue well development until the discharge water is clear and free of sediment to the fullest extent possible, and the pH, temperature and specific conductance have stablized.
- e. Construct a maximum of 30 wells using two-inch inside diameter, stainless steel casing. Use threaded screw-type joints only. Flush thread all connections. Screen 15 feet in each well using two-inch diameter stainless steel casing with up to 0.010 inch slots. Well screening should extend ten feet into the aquifer and five feet above the water table to collect floating contaminants and allow for yearly fluctuations in the water table; however, this may not alway be possible due to site-specific groundwater conditions. Do not extend well screens to the ground surface, a minimum two foot bentonite or cement grout seal is required above all well screens, see paragraph 6.g. below. Cap the bottom of the screen. Well installation shall not exceed 1000 linear feet.
- f. Should a confining layer below the saturated zone be encountered while attempting to drill deep enough to install 15 feet of

screen, grout the hole in the confining layer to prevent potential contaminant migration and screen the well above the confining layer.

- g. Once the casing is installed, remove the augers and allow the soil formation to collapse around the well screen. Supplement the natural gravel pack with washed and bagged rounded sand or gravel with a grain size distribution compatible with the screen and formation. Place the gravel pack from the bottom of the borehole to two feet above the top of the screen. Tremie a granulated, pelletized, or slurry bentonite seal above the gravel/sand pack. Install the bentonite to a minimum thickness of two feet, and ensure a complete seal forms. Place Type I Portland cement grout from the bentonite seal to the land surface.
- h. Complete the wells by extending the well casing a minimum of two feet above land surface. The height of the casing riser must take into account standing surface water depths during the wet season to prevent surface waters from cascading down the well casing. Provide an end-plug or casing cap for each well. Shield the extended stainless steel with a steel guard pipe which is placed over the casing and cap, and seated in a 16-inch by 16-inch by 4-inch concrete surface pad. Slope the pad away from the well casing. Install a lockable cap or lid on the steel guard pipe. Install three four-inch diameter steel guard posts if the base determines the well is in an area which needs such protection. The guard posts shall each be eight feet in total length and installed radially from each wellhead. Recess the guard posts approximately four feet into the ground and insure they are removable to facilitate access for sampling pump installation. Paint the protective steel pipe and clearly number the well on the sleeve exterior.
- i. Determine by survey the elevation at the top of the casing of all newly installed monitor wells to an accuracy of 0.01 feet with respect to a base bench mark. Horizontally locate the new wells to an accuracy of 1.0 feet and record the position on both project and site specific maps. Bench marks must have previously been established from and are traceable to a USCGS/USGS survey marker.
- j. Measure water levels at all monitor wells as feet below the ground surface or below the top of casing elevation to the nearest 0.01 feet. Report in terms of mean sea level. Measure static water levels in the wells prior to sampling and at well development. After the wells have recovered from water sample collection, measure water levels to confirm previous measurements.
- 7. Allow wells to stabilize after development for a minimum of 24 hours prior to sampling. Purge wells prior to sampling until a minimum of three well volumes of water have been displaced and the pH, temperature, specific conductance, color, and odor of the discharge have stablized. Use a stainless steel or teflon bailer, or air-lift pump to purge wells. Sample using a bottom-discharge Teflon bailer.
- 8. If the well(s) cannot be sampled due to well development, well characteristics, or other reason(s), indicate the reason(s) in the report specified in Item VI.
- 9. Collect and analyze one round of water samples from all groundwater monitor wells. During sample collection from all wells, examine the surface of the water table for the presence of hydrocarbons and, if applicable, measure the thickness of the hydrocarbon layer.

10. Soil Borings

- a. Conduct 19 soil borings not to exceed a maximum of 250 linear feet. The average estimated boring depth is ten feet except where noted in Section B. Accomplish the borings using hollow-stem auger techniques. Obtain samples using ASTM Method D-1526.
- b. During the boring operations, take samples at two and one-half foot intervals to develop lithographic descriptions and stratigraphic logs. Monitor the auger cuttings for signs of changing formations. Place special emphasis on field identification of contaminated soils encountered.
- c. Scan all soil samples with a photoionization meter or equivalent organic vapor detector. Include monitoring results in the boring logs.
- d. Whenever possible, measure water levels in all boreholes after the water level has stabilized.
- e. Grout all boreholes to the surface. It is especially important to ensure that they be adequately resealed to preclude future rigration of contaminants.
- f. Permanently mark each location where soil borings are drilled. Record the location on a site specific map.
- ll. Collect pond sediment samples using a drop corer device or an Ekman dredge. Obtain surface soil samples using a stainless steel spoon or spade. Decontamination procedures outlined below are applicable.
- 12. Analyze water and soil samples collected as specified in Section B for those parameters summarized in Table 2. Laboratories conducting the analyses of samples must be certified as required by state or other regulatory agency standards as applicable in the State of Minnesota. The required detection limits and methods for these analyses are delineated in Table 4. Maintain all raw laboratory data for a minimum of five years after project completion and provide raw data to the USAFOEHL upon quest.
- 13. Methods which employ gas chromatography (GC) as the analytical technique--EPA Methods 601, 602, 608, 615, 8010, 8020, 8080, 8150--require positive confirmation of identity for all analytes having concentrations higher than the Method Detection Limit (MDL). This positive confirmation shall be conducted by second-column GC; however, gas chromatography/mass spectroscopy (GC/MS) can be used for positive confirmation if the quantity of each analyte to be confirmed is above the detection level of the GC/MS instrument. Analytes which cannot be confirmed will be reported as "Not Detected" in the body of the report, but the results of all second-column GC or GC/MS confirmational analyses are to be included in the report appendix along with other raw analytical data. Quantification of confirmed analytes will be based upon the first column analysis. The maximum number of confirmational analyses that will be funded under this delivery order is fifty percent (50%) of actual field samples. The total number of samples for each GC method listed in Table 2 includes this allowance.
 - 14. Analyze an additional 15% of all sample parameters for quality

control purposes. Field blanks must be an integral part of the quality control program. Provide all quality control sample analysis results in the report.

- 15. Plot and map all field data collected for each site according to surveyed positions. Identify or estimate the nature of contamination, its magnitude, and the potential for contaminant flow to receiving streams and ground water.
- 16. Remove all borehole cuttings and clean the general area following the completion of each well and boring. Properly containerize cuttings suspected of being contaminated (based on discoloration, odor or organic vapor detection instrument). Test the suspected contaminated waste for EP Toxicity and Ignitibility. The contractor shall be responsible for transporting drums containing suspected contaminated soils. The contractor shall be responsible for the ultimate disposal of contaminated soils in accordance with current Federal, State, and/or local hazardous waste disposal laws. The contractor shall provide a final, completed copy of the hazardous waste manifest document to the HQ TAC/SGPB point of contact ferenced in paragraph V for those borehole cuttings obtained from TAC tes (Sites 1, 5, 6, 7, and 9) and to the ANGSC/SGB point of contact referenced in paragraph V for those borehole cuttings obtained from ANG sites (Sites 2, 3, 4, 8, and 10).
- 17. Decontaminate all sampling and well purging equipment prior to use and between samples to avoid cross contamination. As a minimum, wash equipment with a laboratory-grade detergent followed by a distilled water rinse, repeating the rinsing procedure two more times. Where field conditions warrant, follow the laboratory-grade detergent wash with a hexane rinse, rinse with distilled water, and finally wash with dilute nitric acid and rinse again with distilled water. Allow sufficient time for the solvent to evaporate and for the equipment to dry completely. The calibrated water level indicator for measuring well volume and fluid elevation must be decontaminated before use in each well.
- 18. Thoroughly clean and decontaminate the drilling rig and tools fore initial use and after each borehole completion. As a minimum, steam clean drill bits after each borehole is installed. Drill from the <u>least</u> to the most contaminated areas, if possible.
- 19. Evaluate available techniques for well abandonment that are applicable to the type of monitor wells and geological conditions at Duluth IAP. Consider that these wells will be abandoned at some future date after the study objectives have been met and they are no longer needed. Recommend a candidate abandonment method or technique, including costs. Ensure abandonment techniques comply with state and local rules. The actual process of well abandonment is not part of this study.
- 20. Perform an inventory of all on-base wells, to include production, irrigation, abandoned, monitoring, etc.
- 21. Conduct a literature search of local hydrogeologic conditions to complement the Phase I and Phase II Reports. Use this data to determine optimum well locations. Include the pertinent literature search information in Appendix D of the Final Report. Develop the literature search data using the following guideline:
 - a. Topographic data

- b. Geologic data
 - (1) Structure
 - (2) Stratigraphy
 - (3) Lithology

c. Hydrologic data

- Location of existing wells, observation holes and (1)springs within a one-mile radius of sites to be investigated.
 - (2) Groundwater table and piezometric contours
 - (3) Depth to water
 - (4) Quality of water
- Data on existing wells, observation holes, and springs withi a one-mile radius of sites to be investigated.
- (1) Location, depth, diameter, types of wells, and construction logs
- (2) Static and pumping water level, hydrographs, yield, specific capacity, and quality of water
- (3) Present and projected groundwater development and anticipated use (4) Corrosion, incrustation, well interference, and similar operation and mainte ance problems
- (5) Location, type, geologic setting, and hydrographs of springs
 - (6) Observation well networks
 - (7) Existing water sampling sites
 - Aquifer data
 - Type, such as unconfined, artesian, or perched
 - (2) Thickness, depth, and formation designation
 - (3) Boundaries
 - (4) Transmissivity, storativity, and permeability
 - (5) Specific retention
 - (6) Discharge and recharge
 - (7) Ground and surface water relationships
 - (8) Aquifer models
 - f. Climatic data
- Precipitation F33615-83-D-4002/0038

(2) Evapotranspiration

B. In addition to the general items delineated in A above, conduct the following specific actions at the sites identified in Table 1 and Figure 1 (required analytical parameters are listed in Table 2):

1. Site 1 (TAC) - Goose Dump 1(D-1)

- a. Drill and construct a maximum of four monitor wells. Position three of the wells at the site perimeter consistent with the assumed downgradient direction of groundwater flow. To collect ambient water quality information, place the fourth well outside the site perimeter consistent with the assumed upgradient direction of groundwater flow. Collect one groundwater sample from each monitor well. During the borehole drilling collect a maximum of four soil samples for laboratory analysis, see L.A.6.c.
- b. Drill one soil boring in the suspected zone of contaminatic and collect soil samples from the ground surface and at each two and one-half foot interval until the estimated final borehole depth of ten feet is reached. Analyze the samples from the surface and at the two and one-half and five foot depths.
- c. Designate two sampling points from surface waters located a the site, or from surface waters adjacent to and downstream of the site.
- d. Collect both a water sample and a bottom sediment sample from each of these surface water sample points.
- e. Analyze all water and soil samples for volatile organic and aromatic compounds (VOA), oil and grease (O&G), pesticides/herbicides (P/H), polychlorinated biphenyls (PCBs), phenols and metals.

2. Site 2 (ANG) - Fire Training Areas 1 and 2 (FT-1 and FT-2)

- a. Drill and construct a maximum of five monitor wells. Position one well consistent with the assumed upgradient direction of groundwater flow. Use information from this well to establish ambient water quality. Place four wells in the assumed downgradient direction of groundwater flow; two between FT-1 and FT-2 on either side of the access road and two north of FT-2. Collect one groundwater sample from each monitor well. During the borehole drilling, collect a maximum of five soil samples for laboratory analysis, see I.A.6.c.
- b. Drill two soil borings in FT-1 and one soil boring in FT-2. Locate each boring in the center of a burn pit. If the second and older burn pit in FT-1 cannot be defined through aerial photographs or a physical site inspection, only drill one boring in FT-1. Collect soil samples from the ground surface and at each two and one-half foot interval until the estimated final borehole depth of ten feet is reached. Analyze the samples from the ground surface and the two and one-half and five foot depths.
- c. Designate sampling points in the drainageway between the western extension of the access road and the southwestern boundry of site FT-2. Collect two surface water samples and two bottom sediment samples from this drainageway.
 - d. Collect one surface sediment sample and one surface water

sample from the swamp to the north and downgradient of FT-2.

- e. Collect one round of groundwater samples from the six existing monitor wells at these sites.
 - f. Analyze all water and soil samples for VOA, O&G and phenols.

3. Site 3 (ANG) - DPDO Storage Area "C" (S-2)

- a. Drill and construct a maximum of four monitor wells. The positioning, and soil and water sampling follows that specified at Site 1, para B.I.a.
- b. Drill three soil borings positioned along a center-line running north to south in the storage area. Follow the soil sampling plan specified at Site 1, para B.1.b.
- c. Designate sampling points in the drainageway which begins on the east side of the storage area and then heads in a northwesterly direction. Collect three surface water samples and three bottom sediment samples from this drainageway. Collect the first sediment and water sample in the approximate location of Sample 2 identified in the Stage 1 study. bequent sample points should be at 100 foot intervals downgradient along the drainageway.
- d. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

4. Site 4 (ANG) - Tank Farm Area (SP-1)

- a. Perform a geophysical survey using a metal detector and a magnetometer to precisely locate underground pipes. Perform an electromagnetic survey to identify leak sites from these pipes. Survey the entire tank farm to include a minimum 50 foot buffer around the site perimeter. Expand the geophysical survey on the southern side of the tank farm area to the main access road. A former fueling facility is located south of the tank farm.
- b. Drill and construct a maximum of four monitor wells. The ll positioning, and soil and water sampling follows that specified at Site 1, as B.1.a.
- c. Drill five soil borings, position them based upon the geophysical survey result and the data generated during the Stage 1 study. Boring depth is estimated to be 15 feet; however, drill until the water table is reached. Collect soil samples at two and one-half foot intervals beginning at ground surface. Analyze the samples collected at two and one-half, five, and seven and one-half foot depths.
- d. Designate sample points in the drainageways/culverts around the site, of particular interest is the drainageway heading north to Beaver Creek. Collect four surface water and four sediment samples from the drainageways/culverts.
- e. Collect one round of groundwater samples from the four existing monitor wells at this site.
 - f. Analyze all water and soil samples for VOA and O&G.

5. Site 5 (TAC) - South Goose Dump (D-4)

- a. This site was originally designated D-4. South Goose Missle Site Dump, in the Phase I report and was not recommended for Phase II Stage 1 evaluation. However, during Phase II Stage 1, it was erroneously confused with D-1. Goose Missle Site Dump, which was recommended for Phase II Stage 1 monitoring. Consequently, this site was studied during the Phase II Stage 1 effort, but referenced as site D-1 throughout the report.
- b. Drill and construct three monitor wells. Position two of the wells approximatley 50 feet from the site perimeter and consistent with the assumed downgradient direction of groundwater flow. Place the other monitor well outside the site perimeter and consistent with the assumed upgradient direction of groundwater flow so as to collect ambient water quality information. Collect one groundwater sample from each monitor well. During the borehole drilling, collect a maximum of three soil samples for laboratory analysis, see I.A.6.c.
- c. Collect three surface water samples from the pond/swamp t this site.
- d. Collect a maximum of five sediment samples from the bottom of the pond/swamp area and drainageways which exit this site.
- e. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

6. Site 6 (TAC) - Goose Dump 2 (D-2)

- a. Perform a geophysical survey using a metal detector and a magnetometer to locate the dump site drums. Also conduct a detailed examination of available aerial photographs for the same purpose.
- b. If the geophysical survey and aerial photographs cannot locate the drums and accurately define the site location, perform no more work.
- c. If the site can be located, drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at two and one-half foot intervals until the estimated final borehole depth of ten feet is reached. Analyze the samples from the surface and at two and one-half feet for ethylene glycol, O&G and VOA.

7. Site 7 (TAC) - Runway 13 NE Disposal (D-6)

- a. Perform a geophysical survey using a metal detector and magnetometer to define as accurately as possible the site boundaries. Also conduct a detailed examination of available aerial photographs for the same purpose.
- b. Drill and construct three monitor wells. The positioning, and soil and water sampling follows that specified at Site 5, B.5.b.
- c. Drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at two and one-half foot intervals until the estimated final borehole depth of ten feet is reached. Analyze the samples from the surface and at the two and one-half foot depth.
 - d. If surface drainage from the site can be located, collect

one each bottom sediment and surface water sample outside, but within 20 feet, of the site boundry.

e. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

8. Site 8 (ANG) - Old DPDO Storage Area (S-1)

- a. Drill and construct three monitor wells. The positioning, and soil and water sampling follows that specified at Site 5, B.5.b.
- b. Drill two exploratory soil borings, one in the center of each of the two former storage area sites. The soil sampling plan follows that specified at Site 1, B.1.b.
- c. Collect two surface water and two bottom sediment samples from drainageways at points downstream of the site.
- d. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

9. Site 9 (TAC) - Disposal Pit (D-9)

- a. Perform a geophysical survey using a metal detector and a magnetometer to locate the site. Also conduct a detailed examination of available aerial photographs for the same purpose.
- b. If the geophysical survey and aerial photographs cannot accurately define the site location, perform no more work.
- c. If the site can be located, drill one exploratory soil boring in the zone of contamination. Collect soil samples at two and one-half foot intervals and analyze the samples at two and one-half feet above and below the water table.
- d. If the site can be located, drill and construct one monitor well at the site perimeter consistent with the assumed 'owngradient direction of groundwater flow. Collect one groundwater sample.
- e. Analyze all water and soil samples for acetone and picric acid.

10. Site 10 (ANG) - Low-Level Radioactive Waste Disposal (RD-1)

- a. Conduct a geophysical survey (metal detector and magnetometer) and review aerial photographs to accurately locate the site.
- b. Drill and construct three monitor wells. Position two of the wells at the site perimeter consistent with the assumed downgradient direction of groundwater flow. Place the third well in the assumed upgradient direction of groundwater flow to collect ambient water quality information. Do not analyze soil samples from these boreholes.
- c. Collect one groundwater sample from each well and analyze them for gross alpha, gross beta, radium 226 and radium 228.
 - C. Field Coordination

Notify the Air Force POC's (see section V) at the USAFOEHL and Duluth IAP at least five days in advance of water sample collection dates.

D. Technical Field Operations Plan

Develop a detailed field operations plan based upon the technical requirements specified in this task description for the proposed work effort. Be explicit with regards to field procedures. Include, but do not limit the plan to, field decontamination operations, sampling protocol, QA/QC field procedures, field schedule, etc. A guideline for the plan is provided under separate cover. Reference paragraph VI, Sequence No. 2.

E. Health and Safety

Comply with all applicable USAF, OSHA, EPA, state and local health and safety regulations regarding the proposed work effort. Use EPA guidelines for designating the appropriate levels of personnal protection at tudy sites. Prepare a written Health and Safety Plan for the proposed work ifort and coordinate it directly with regulatory agencies where required. Provide an information copy of the Health and Safety Plan to the USAFOEHL prior to commencing field operations (i.e., drilling and sampling). (Reference paragraph VI, Sequence No. 7)

F. Data Review

- l. Tabulate field and analytical laboratory results (including quality control data), and incorporate them into the monthly R&D Status Reports. Forward them to the USAFOEHL for review as soon as they become available as specified in Item VI below. In addition to the results, report the dates of sample collection, extraction (if applicable) and analysis.
- 2. Upon completion of all analyses, tabulate and incorporate all -esults into an Informal Technical Information Report (Atch 1, Seq 3 as pecified in the contract and in Item VI below) and forward the report to the USAFOEHL for review.
- 3. Immediately report to the USAFOEHL Program Manager via telephone, data/results generated during this investigation which indicate a potential health risk (for example, a contaminated drinking water aquifer).

G. Reporting

- 1. Prepare two draft reports following the USAFOEHL-supplied report format (mailed under separate cover). One report shall delineate the findings for the TAC sites (Sites 1, 5, 6, 7, and 9). The second report shall detail the findings at the ANG sites (Sites 2, 3, 4, 8, and 10). Forward the reports to the USAFOEHL (as specified in item VI below) for Air Force review and comment.
- 2. Review the results, conclusions and recommendations from previous IRP investigations which concern the sites listed in this task. Integrate all investigative work done at each site to date so the report reflects the total available information for each site. Use this cumulative information and data to establish trends and develop conclusions and recommendations.

- 3. Include in this report a discussion of regional/site-specific hydrogeology, well and borings logs, data from water level surveys, groundwater surface and gradient maps, and avalable hydrogeologic cross sections and geophysical survey data.
- 4. In the results section, include water and soil analysis results, field quality control sample data (field blanks, duplicates, etc.), internal laboratory quality control data (lab blands, lab spikes, and lab duplicates), and laboratory quality assurance information. Provide second-column confirmation results and include which columns were used, the conditions existing and retention times.
- 5. Make estimates of the magnitude, extent and direction in which detected contaminants are moving. Identify potential environmental consequences of discovered contamination based upon State and/or Federal standards.
- 6. Summarize the specific collection techniques, analytical method holding time and limit of detection used for each analyte (Standard Methods, EPA, ASTM, etc.).
- In the recommendation section, address each site and list them Ly category. Category I consists of sites where no further action, including remedial action, is required. Data for these sites are considered sufficient to rule out unacceptable health or environmental risks. Category II sites are those requiring additional investigation to quantify or further assess the extent of current or future contamination. Category III denotes sites that will require remedial action (ready for IRP Phase IV). In the recommendations for Category III sites, include any possible influence on sites in Categories I and/or II due to their connection to the same hydrological system. Clearly state any dependency between sites in Include a list of candidate remedial action different categories. alternatives, including Long Term Monitoring (LTM) as remedial action, and the corresponding rationale that should be considered in selecting the remedial action for a given site. List all alternatives that could potentially bring the site into compliance with environmental standards. For contaminants that do not have standards, EPA recommended safe levels for non-carcinogens (Health Advisory or Suggested-No-Adverse-Response Levels) d target levels for carcinogens (1 x 10 cancer risk level) may be If not specifically requested, do not include a comprehensive cost or technical analyses of alternatives. However, in those situations where field survey data indicate immediate corrective action is necessary, present specific, detailed recommendations. For each category above, summarize the results of field data, environmental or regulatory criteria, or other pertinent information supporting conclusions and recommendations.
- 8. For those sites needing additional Phase II study, identify specific requirements, if any, for future monitoring. Identify potential environmental consequences of contamination. Provide estimates of costs by line items for additional investigations beyond this stage along with estimates of time required to accomplish the investigation. Furnish the cost data in a separately bound appendix to the final report. (Reference paragraph VI, Sequence No. 2)
- 9. Provide an inventory of all on-base wells, to include production, irrigation, abandoned, monitoring, etc.
- 10. Include in an appendix to the report the names of all local, state or other regulatory personnel and the dates they approved well

drilling, development and purging techniques, well materials, and sampling methods. All well drilling, development, purging, and sampling must conform to State and local regulatory agency requirements.

11. Provide the candidate well abandonment techniques and the recommended techniques most appropriate for Duluth IAP.

H. Meetings

The contractors project leader shall attend two meetings to take place at a time to be specified by the USAF OEHL. Each meeting shall take place at Duluth IAP for a duration of one day (eight hours).

II. SITE LOCATION AND DATES

Duluth IAP MN
Date to be established

III. BASE SUPPORT

- A. Prior to any contractor digging or drilling, locate underground utilities and issue digging permits.
 - B. Provide access to the Phase II Stage 1 monitoring wells.
- C. Provide the contractor with existing engineering plans, drawings, diagrams, aerial photographs, etc., as needed to evaluate sites under investigation.
- D. The base Point Of Contact shall receive from the contractor the split samples, select 10% of them, package them, and then deliver them back to the contractor within 24 hours for subsequent overnight shipment to USAFOEHL/SA as stated in paragraph I.A.5.
 - E. Provide contractor with a secure staging area for storing quipment and supplies.
- F. Provide a paved area where drilling equipment can be cleaned and decontaminated.
- G. Base Civil Engineer will prepare and sign any hazardous waste manifest documentation resulting from this effort.
- H. Base will store any drums containing suspected hazardous waste until determined to be hazardous/non-hazardous.
- IV. GOVERNMENT FURNISHED PROPERTY: None
- V. GOVERNMENT POINTS OF CONTACT:
 - 1. 2Lt Gary Woodrum USAFOEHL/TSS Brooks AFB TX 78235-5501 AV 240-2158 (512) 536-2158 1-800-821-4528
- 2. Col Jerry Dougherty HQ TAC/SGPB Langley AFB, VA 23665-5001 AV 432-5857 (804) 764-2180

- 3. Lt Col Michael Washeleski ANGSC/SGB Andrews AFB, MD 20331-6008 AV 858-3443/5926 (301) 981-5926
- 4. Sgt Suzanne Schlies 148 TAC Clinic Duluth IAP MN 55811-5000 AV 825-7223 (218) 723-7224

VI. In addition to sequence numbers 1, 5 and 11 listed in Attachment 1 to the contract, and which apply to all orders, the sequence numbers listed below are applicable to this order. Also shown are dates applicable to this order.

Seq. No.	Para. No.	Block 10	Block 11	Block 12	Block 13	Block 14
2	1.D.	O/TIME	86 OCT 10	86 OCT 13		15
7	I.E.	O/TIME	86 OCT 10	86 OCT 13		3
3	I.F.1.	O/TIME	•	• .		3
- 4	I.G.(TAC)	ONE/R	86 DEC 31	87 JAN 16	87 OCT 16	••
4	I.G.(ANG)	ONE/R	86 DEC 31	87 JAN 16	87 OCT 16	••
2	I.G.8.	O/TIME	87 Jan 16	87 OCT 16		•••
14		MONTHLY	86 OCT 27	86 NOV 11		
15		MONTHLY	86 OCT 27	86 NOV 11		

- Upon completion of the analytical effort and prior to submission of the first draft report.
- Two draft reports and one final report are required. Incorporate Air Force comments into the second draft and final report as specified by the USAF OEHL. Supply the USAFOEHL with a single copy of the first draft, second draft, and final reports for acceptance prior to distribution. Distribute all report copies as specified by the USAFOEHL. Supply 25 copies of each draft report and 50 copies plus the original camera ready copy of the final report. Distribute the remaining 24 copies of each draft report and 49 copies of the final report as specified by the USAFOEHL.
- Submit cost estimates (five copies) in a separately bound document with the final report only. Provide estimates for only those sites recommended for additional Phase II work (Category II) or Phase IV, long-term monitoring (Category III).

TABLE 2

SAMPLING AND ANALYTICAL REQUIREMENTS

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														2nd (10)	
						SITE	SITE NUMBERS	ERS					3	Column	
	Analyte	Medium	-	2	3	4	5	9	7	8	6	01	04(%)	Confirmation	TOTAL
_	(1) AOV	Water, (7)	9	14	7	12	9	1	4	5		, i	6		93
		Soll (8)	6	17	16	23	∞	4	80	11	ı	1	15	53	164
	011 & (2)	Water	9	14	7	12	9	•	4	2	1	1	0		63
	Grease	Sofl	6	11	16	23	æ	4	œ	11	1	1	15	•	111
	Metals (3)	Water	9	•	1	•	9	1	₫	S	•	,	S	•	33
	•	Sofl	6	•	16	1	œ	•	∞	11	•	•	6	•	19
	Pesticides/ ⁽⁴⁾	Water	9	•	7	•	9	•	4	S		•	ß	16	49
	Herbicides	Sofl	6	•	16	•	œ	•	80	11	ı	ı	6	53	8
	PCB	Water	9	•	7	ı	9	1	4	5	ı	•	5	16	49
		Sofl	6	1	16	1	æ	1	&	11	1	•	6	53	8
	Phenol	Water	9	14	7	ı	9	1	4	S	•	1	œ	•	23
		Sofl	0	11	16		œ	1	80	==		•	11	•	8
	Acetone	Water	1	•	٠	•	ı	1	•	1	-	ı	-	•	2
		Sofl	•	ı	•	•	•	1	•	1	~	•	-	•	m
	Picric Acid	Water	١.	•	•	•	1	ì	•		-	•	-	ı	~
		Sofi	1	1	•	•	•	1	•	•	7	•	-	•	က
	Ethylene Glycol	Sofl	ı	•	•	•	1	4	1		ı	ı	-	•	S
	Radiation (5)	Water	•	•	•	•	1	•	1	•	ı	ო	-	•	4
	EP Toxicity (6) Metals	Soil Cuttings	15	Sam	ples fed b	samples authorized fied by site		as n	needed	- not	spect	:	2	•	17
	EP Igniti- bility	Sof1 Cuttings	15	Sam	mples a	samples authorized fied by site		as a	needed	- not	spec1-	+	8	•	11
	NOTES: (See following	Towing page)	_												

21

TABLE 2 (Continued)

- NOTES: (1) See Table 3.
 - (2) Use Method 3550 to extract oil and grease from soil.
 - (3) Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver
 - (4) See Table 5.
 - (5) Includes analysis for Gross Alpha, Gross Beta, Radium-226 and Radium-228.
 - (6) Arsenic, barium, cadmium, chromium, lead, mercury, selenium,
 - (7) Includes both well and surface water samples.
 - (8) Includes both borehole and sediment samples.
 - (9) QA is 15% of the basic sample load.
 - (10) Assumes 50% for Methods 601, 602, 608, 615, 8010, 8020, 8080 and 8150 will require second column confirmation.

TABLE 3

VOLATILE ORGANIC COMPOUNDS (YOA)

PURGEABLE HALOCARBONS EPA Methods 601 and SW 8010

Bromodichloromethane Bromoform **Bromomethane** Carbon tetrachloride Chlorobenzene Chloroethane 2-Chloroethylvinyl ether Chloroform Chloromethane Dibromochloromethane 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1.4-Dichlorobenzene Dichlorodifluoromethane 1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethene trans-1,2-Dichloroethene 1,2-Dichloropropane 1,3-Dichloropropene trans-1,3-Dichloropropene Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene Trichlorofluoromethane Vinyl chloride

PURGEABLE AROMATICS EPA Methods 602 and SW 8020

Benzene
Chlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Ethylbenzene
Toluene

Also: Xylene

TABLE 4

ANALYTICAL PARAMETERS, METHODS AND REQUIRED DETECTION LIMITS

PARAMETER	METHOD	DETECTION LIMIT
Oil and Grease (Using IR)	EPA 413.2	20 µg/g soil ^a 1 mg/l water
Volatile Organic and Aromatic Compounds (VOA)	EPA 601 and 602 SW 8010 and 8020	b b
EP Toxicity	b	c
Ignitibility	SW 1010	đ
Pesticides and/or PCB	EPA 608 SW 3550 and 8080	e 1 μg/g soil
Herbicides	EPA 615 SW 8150	e 1 μg/g soil
Phenol	EPA 420.2	5 μg/l water 5 μg/g soil
Metals		
Arsenic f	EPA 206.2 SW 3050 and 706	10 μg/l water 1 μg/g soil
Barium ^f	EPA 208.2 SW 3050 and 6010	200 μg/l water 20 μg/g soil
Cadmium f	EPA 213.2 SW 3050 and 6010	10 μg/l water 1 μg/g soil
Chromium f	EPA 218.1 SW 3050 and 6010	50 μg/l water 5 μg/, soil
Lead ^f	EPA 239.2 SW 3050 and 6010	20 μg/l water 2 μg/g soil
Mercury f	EPA 245.1 SW 7471	1.0 µg/l water 0.1 µg/g soil
Selenium f	EPA 270.3 SW 3050 and 7740	10 μg/l water 1 μg/g soil
Silver f	EPA 272.2 SW 3050 and 6010	10 µg/l water 1 µg/g soil

TABLE 4 (Continued)

PARAMETER	METHOD	DETECTION LIMIT
Acetone	ASTM D 3695-82	=
Picric Acid	USATHAMA 2B	4
Ethylene Glycol	NIOSH P & CAM 338 Modified for Soil	-
Gross Alpha	Standard Methods: 15th ed, 703	~
Gross Beta	Standard Methods: 15th ed, 703	-
Radium-226	EPA 600/4-80#032, 903	3.0
Radium-228	EPA 600/4-80-032, 901	4.0

TABLE 4 (Continued)

- Item 1.4 This method is recommended by EPA for use only by experienced residue analysts or under the close supervision of such qualified persons.
- Item 2.2 This is most important. If interferences are encountered (as in early peaks such as vinyl chloride), the method provides a secondary chromatographic column that will be helpful in resolving the compounds of interest from interferences. This must be done in the case of vinyl chloride and so noted in the analysis report.
- Items 3.3, 7.1-7.3 These sections must be analyzed within the recommended holding times.
- Item 8.3 All samples must be analyzed within the recommended holding times.

 This must be followed without exception.

If questions are encountered about certain contaminants, you may be asked to show both chromatograms used to rule out possible interferences.

c	Metals	µg/l of Extract
	As	0.053
	Ba	0.1
	Cd	0.005
	Cr	0.05
	Pb	0.1 0.0002
	Hg	
	Se	0.075
	Ag _	0.01

dFind if sample is ignitable at 140 degrees Fahrenheit or below. If so, it is a hazardous waste.

^aBased on extracting 50 grams of soil and 100 ml final extract volume.

Detection limits for Purgeable Organics and Aromatics shall be as specified for the compounds by EPA Methods 601-602. Method: Federal Register, Vol. 44, including these items:

eMethod Detection Limit

Primary Drinking Water Standard, 40 CFR 141.11

TABLE 5

Pesticides and PCBs - EPA Methods 608 and SW 8080

aldrin	a*BHS
dieldrin	b-BHC
chlordane	g ⊢BHC
4,4'-DDT	w-BHC
4.4'ADDE	PCB-1242
4.4.5DDD	PCB-1254
a-endosulfan	PCB-1221
b-endosulfan	PCB-1232
endosulfan sulfate	PCB÷1248
endrin	PCB-1260
endrin aldehyde	PCB÷1016
heptachlor	toxaphene
heptachlor epoxide	•

Herbicides - EPA Method 615 and SW 8150

2,4-D

2,4,5-TP (Silvex)

= 701	H								/UH
P.	-	F OF THE SCHE	DULE		TRUMENT ID NO.		Z. SPIIM	3.	
		CHEDULE DAT		F33615-	83-D-400		9. ENDING 5		28 OF 28
1		PRI	/. MILSIN	IP DUC NO. AND SUFFIX	B. CON TIEM	JERIAL NO.	WHEN A		EXHIBIT
	0001 DEL SCHED DATE	AA 12. ENDING DATE	13. DEL	SCHEDULE QTY *	14. SCTY 15.	SHIP TO	16. MARK	FOR	
	87JUL01	(WHEN APPL)	۸. 1		CLAS []	FY7624			
	0,0000				11. DEL SCHED	DATE 12.	ENDING DATE	13. DEL	SCHEDULE OTY*
8.		8.	€.		0.	D.		D.	
c. 17.	DESCRIPTIVE DATA	c.	c.		€.	٤.		£ .	
A.	SEE SECT	ION H OF T	HE BAS	SIC CONTRAC	T FOR FY	7624 A	DDRESS.		
c.	B. TECHNICAL EFFORT SHALL BE COMPLETED NO LATER THAN 87JAN16. C. ALL DATA SHALL BE DELIVERED IAW ATTACHMENT# 1 OF THE BASIC CONTRACT AS IMPLEMENTED BY PARAGRAPH VI OF THE TASK DESCRIPTION NO LATER THAN 87JUN01. D. THE DATA SHALL BE ACCEPTED BY THE GOVERNMENT NOT LATER THAN THE DATE								
	SHOWN IN	BLOCK 11A					<u> </u>		
1		PRI	7. MILSTRI	IP DOC NO. AND SUFFIX	B. CON ITEM	SERIAL NO.	9. ENDING 5 (WHEN		10. CLIN IDENT
1	0002 DEL SCHED DATE	AA 12. ENDING DATE	13. DEL	SCHEDULE OTY .	14. SCTY 15.	SHIP TO	16. MARK	FOR	
	7JUL01	(WHEN APPL)	A. 1		CLAS	FY7624			
1	700201	A .	*. ±		11. DEL SCHED	DATE 12.	ENDING DATE	13. DEL :	SCHEDULE OTY .
8.		В.	8.		0.	٥.	WHEN AFFE	D.	
c. 17.	DESCRIPTIVE DATA	C.	¢.		Ε.	E.		£.	
В.				SIC CONTRAC		, , , , , , , , , , , , , , , , , , , ,		15.	
4.	ITEM HO.		7. MILSTRI	P DOC NO. AND SUFFIX	B. CON ITEM	SERIAL NO.	9. ENDING SE		10. CLIN IDENT
 	204	AA					(WHEN	APPLI	EXHIBIT
l	DEL SCHED DATE	12. ENDING DATE (WHEN APPL)	13. DEL	SCHEDULE QTY .	14, SCTY 15, CLAS	SHIP TO	16. MARK	FOR	
A. 1	87JUL01	A.	A. 1			FY7624		13. DEL 5	CHEDULE GTY+
•.		■.	●,		D. "		WHEN APPL	¢.	
c.		c.	c.		t.	t.		£.	
17.	DESCRIPTIVE DATA								
A.	SEE SECT	ION H OF T	HE BAS	SIC CONTRAC	T FOR FY	7624 A	DDRESS.		
в.	ALL CHEM AS IMPLE	ICAL ANALY	SIS DA PARAGA	BE COMPLETE ATA SHALL B RAPH VI OF	E DELIVE	RED IA	W ATTACE	is. Hment#	1
D.	THE DATA	SHALL BE BLOCK 11A	ACCEP1	TED BY THE	GOVE RNME	NT NOT	LATER 7	THAN T	HE DATE

"REPRESENTS A NET INCREASE/DECREASE WHEN NO + OR - APPEARS AFTER THE ITEM NO. E = ESTIMATED

AFSC FORM 706 PREVIOUS EDITION WILL BE USED.

AFSC - Andrews AFB Md 1979

^{- (}IN QTY) = DECREASE

⁺ OR - (IN ITEM NO.) = ADDITION OR DELETION

APPENDIX C
WELL NUMBERING SYSTEM

GROUND WATER WELL AND SOIL BORING NUMBERING SYSTEM

GROUND WATER MONITOR WELL

The ground water monitor well numbering system consists of three fields. Field 1 is the abbreviation "GW", which indicates ground water. This distinguishes these monitor wells from the Phase II, Stage 1 monitor wells, which were labeled "MW".

Field 2 indicates the site number of the well location and is as follows:

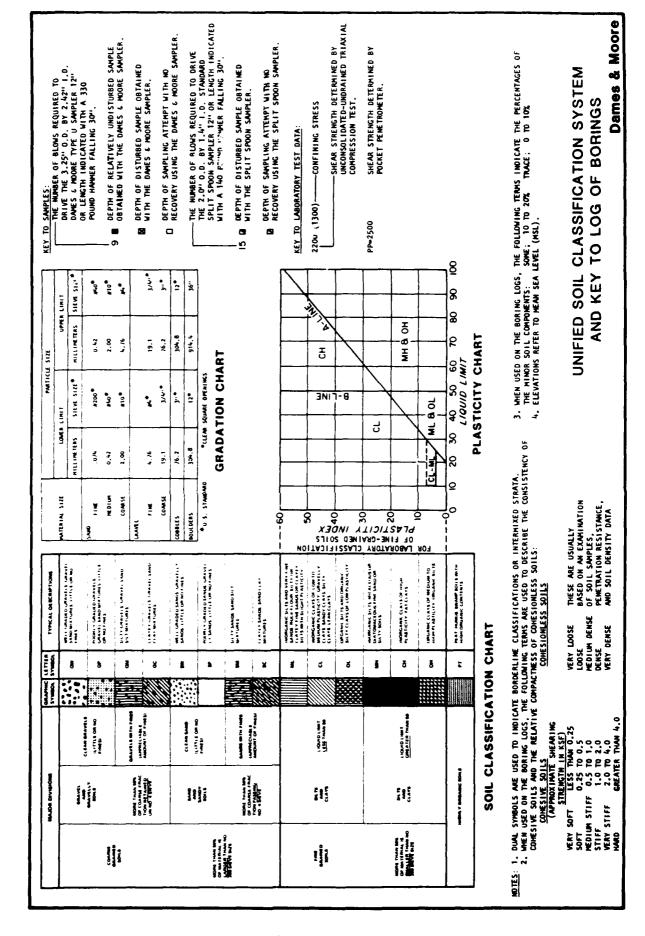
Site Number	Phase I Number	Site Description			
1	D-1 (TAC)	Goose Dump 1			
2	FT-1 and FT-2 (ANG)	Fire Training Areas			
3	S-2 (ANG)	DPDO Storage Area "C"			
4	SP-1 (ANG)	Tank Farm Area			
5	D-4 (ANG)	South Goose Dump			
6	D-2 (TAC)	Goose Dump 2 (borings only)			
7	D-6 (TAC)	Runway 13 NE Disposal			
8	S-1 (ANG)	Old DPDO Storage Area			
9	D-9 (TAC)	Disposal Pit (no work done)			
10	RD-1 (ANG)	Low-Level Radioactive Waste Disposal			

Field 3 indicates the sequential order in which the monitor wells are drilled, lettered consecutively beginning with the letter "A".

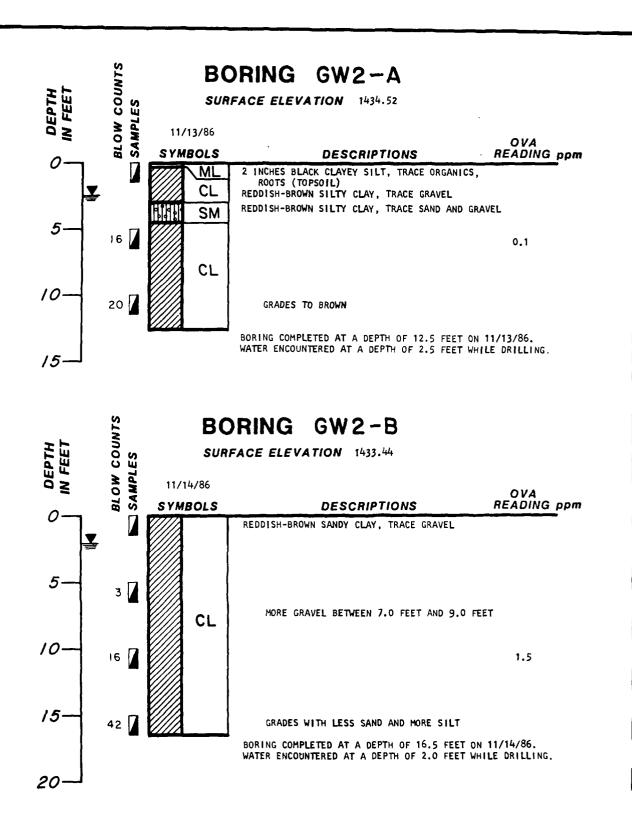
SOIL BORING

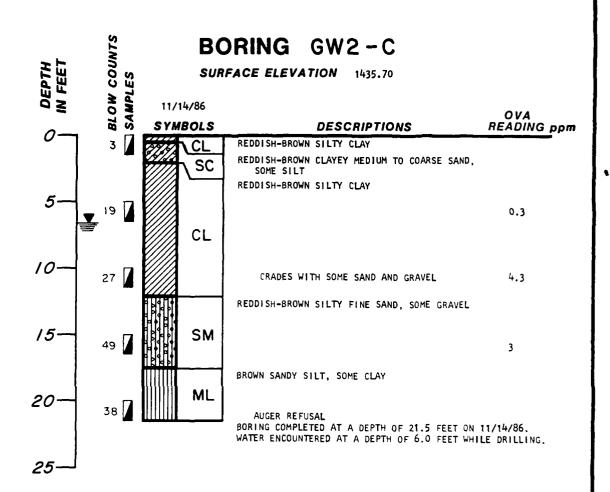
The soil borings are numbered according to a system similar to that used for the ground water monitor wells. Field 1 is the abbreviation "B", which indicates boring. Field 2 indicates the site number of the boring location (i.e., 1). Field 3 indicates the sequential order in which the borings are drilled, lettered consecutively beginning with the letter "A".

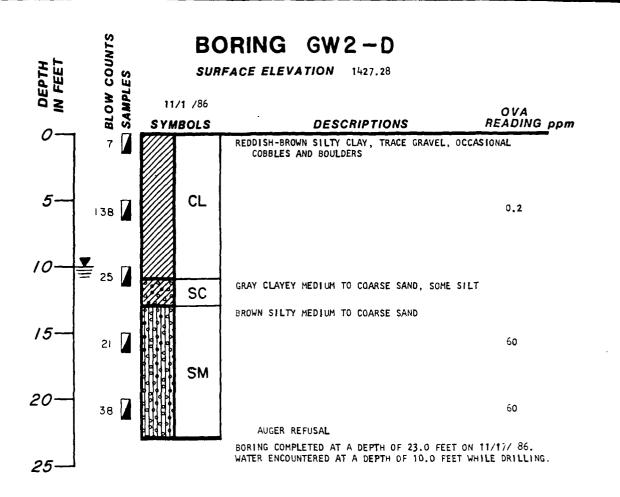
APPENDIX D BORING AND WELL COMPLETION LOGS

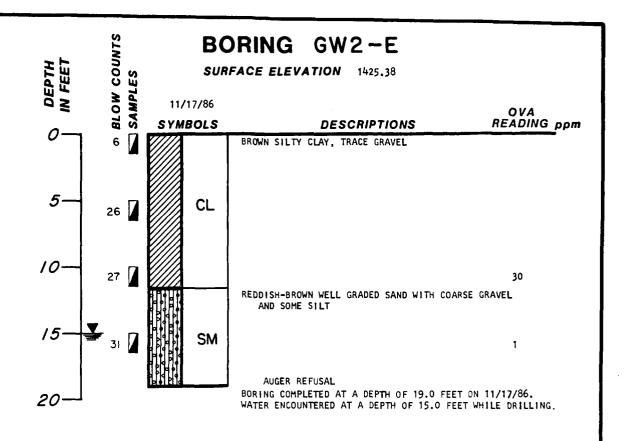


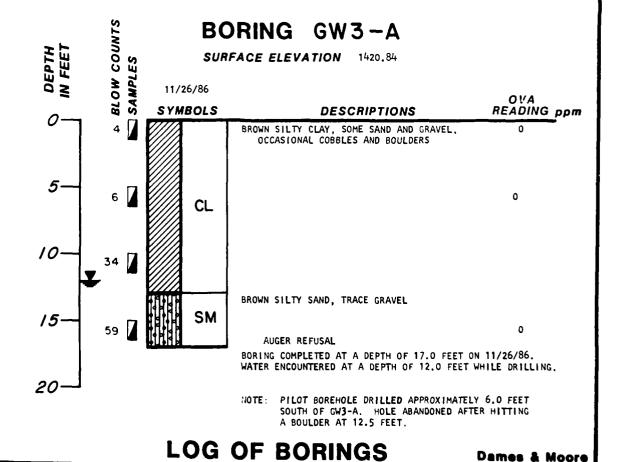
7

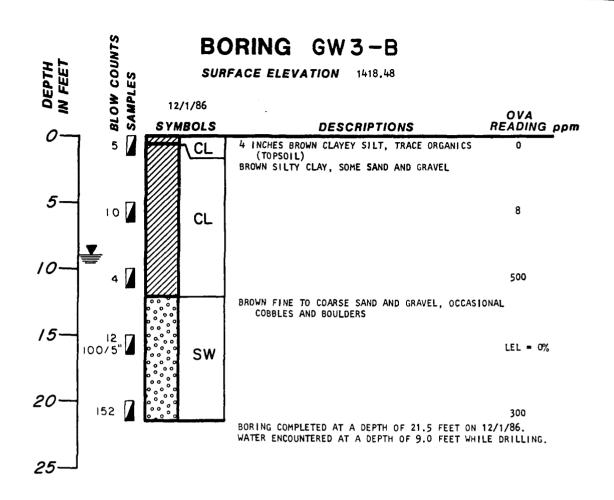


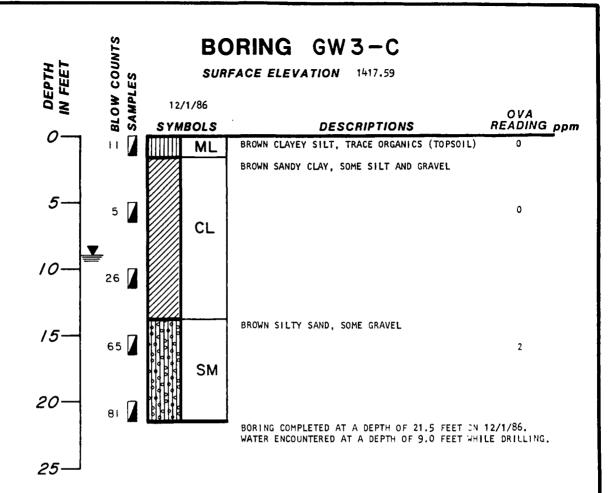


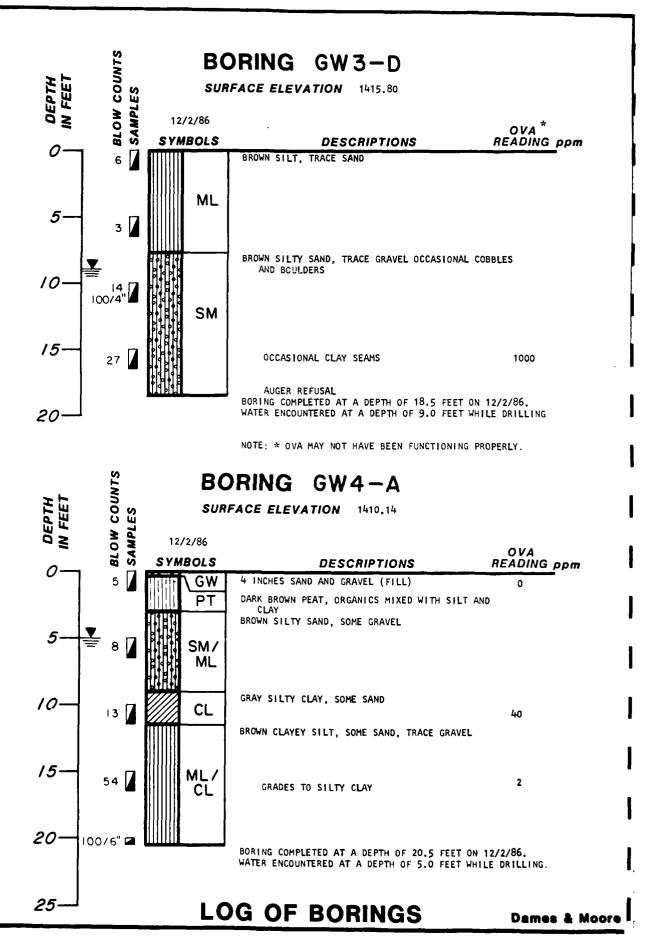


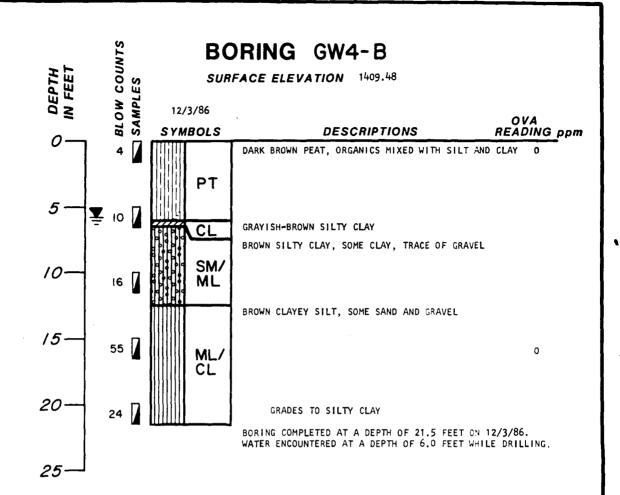


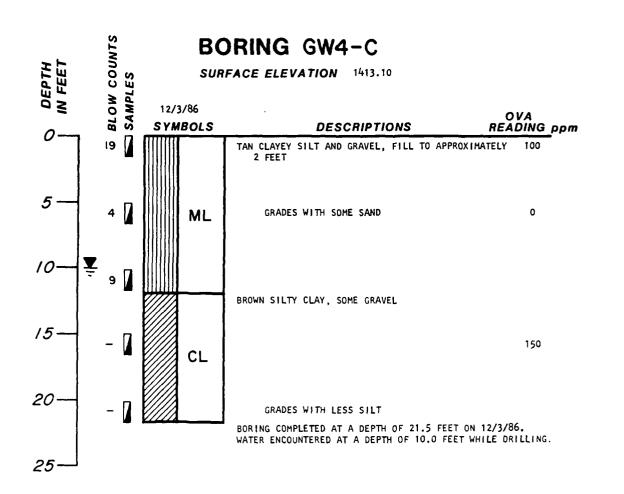


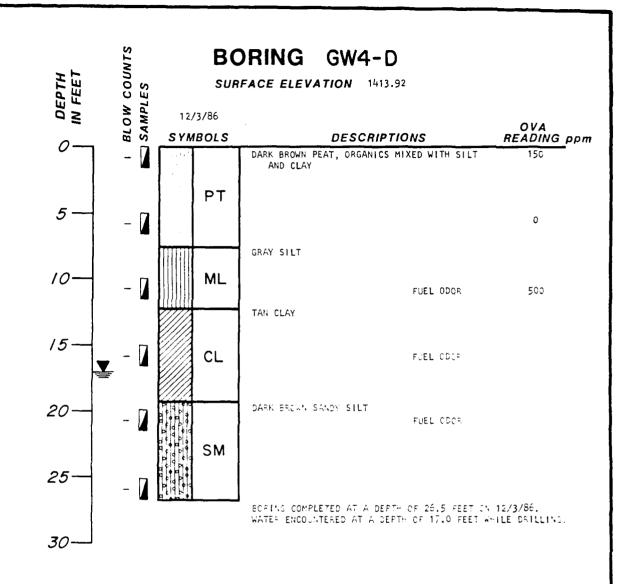


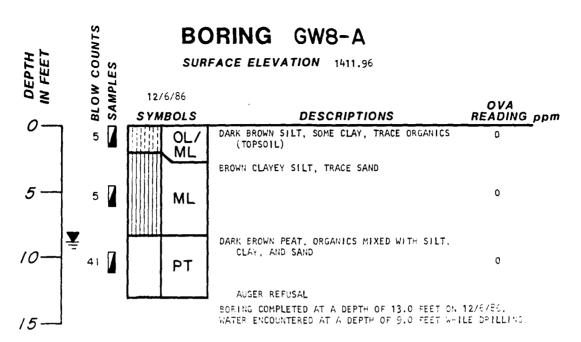








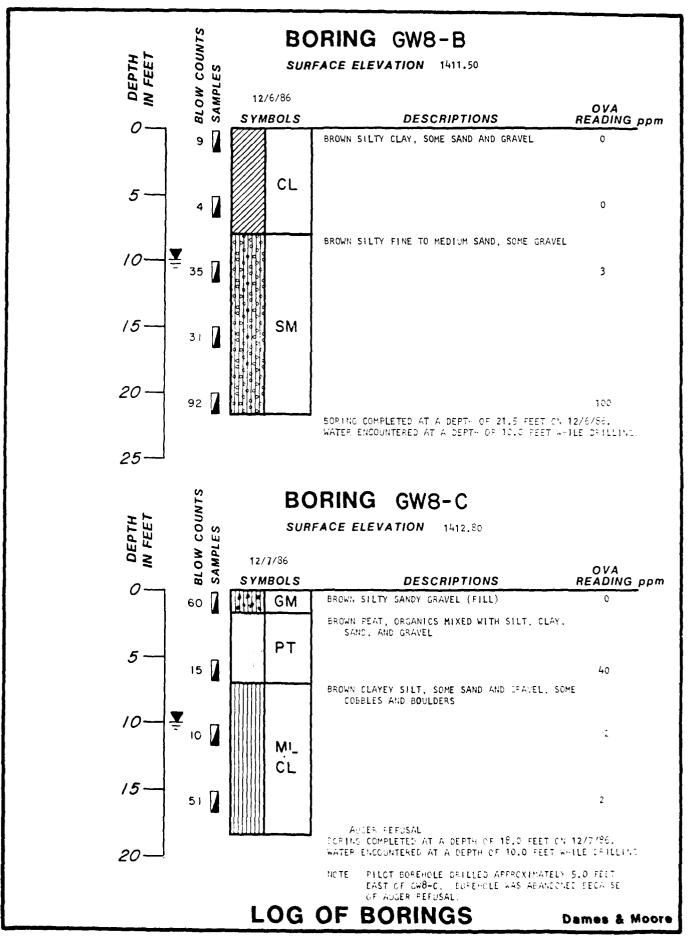


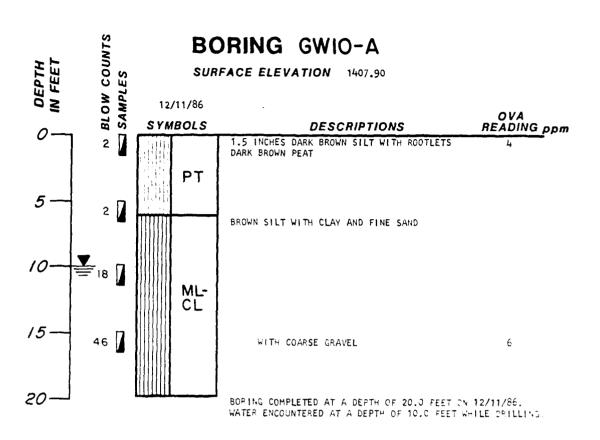


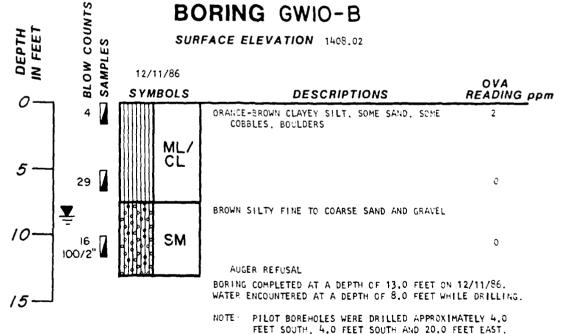
NOTE: PILOT BOREHOLE DRILLED 5.0 FEET EAST OF GW8-A. AUGER REFUSAL AT 13.0 FEET.

PILOT BOREHOLE DRILLED 13.0 FEET EAST OF GW8-A. AUGER BROKE OFF, 5.0 FOOT STRING LOST AT DEPT- OF 15.0 FEET.

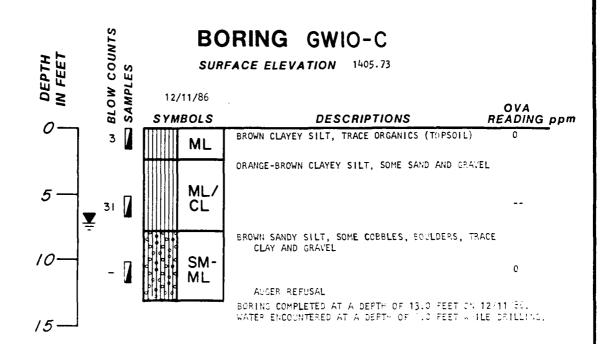
LOG OF BORINGS

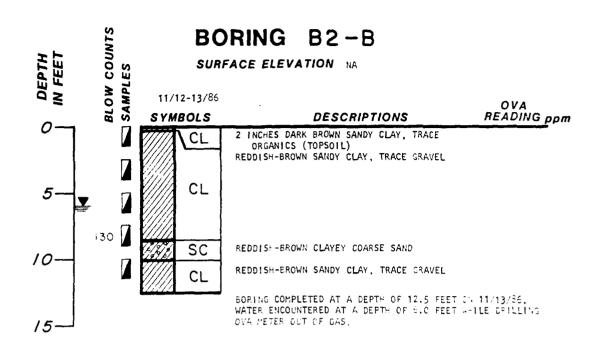


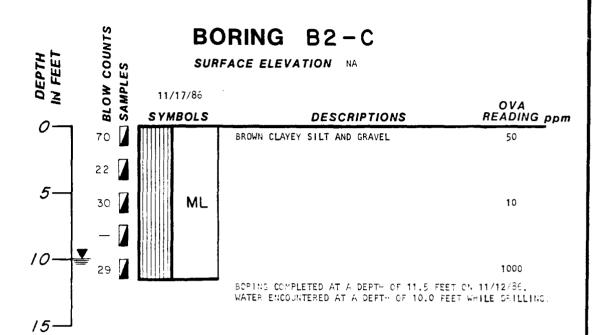


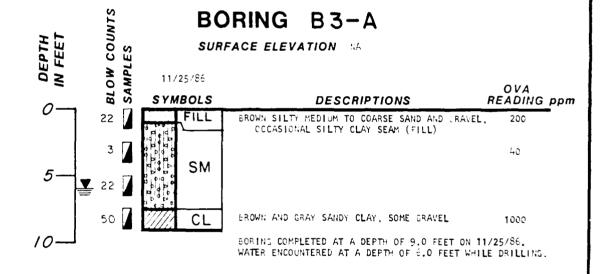


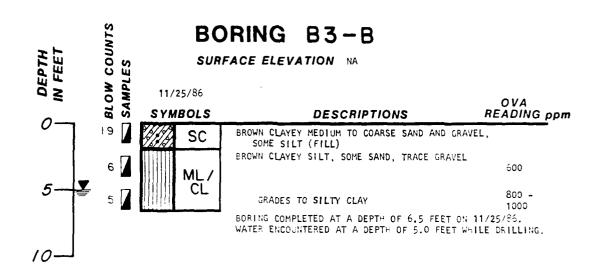
AND 8.0 FEET SOUTH AND 20.0 FEET EAST. BOREHOLES WERE ABANDONED BECAUSE OF AUGER REFUSAL.

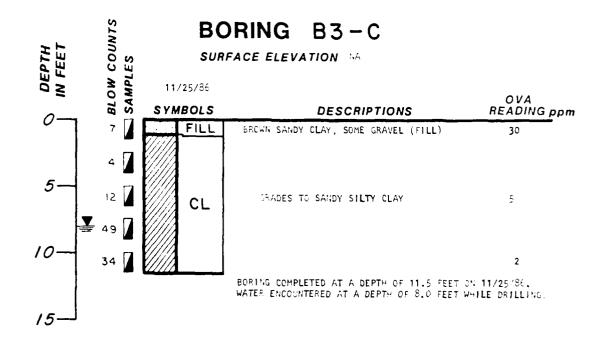


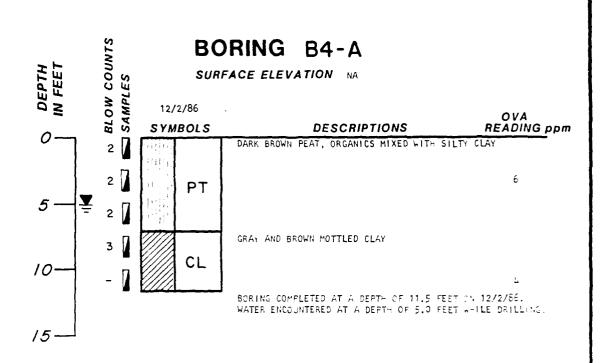


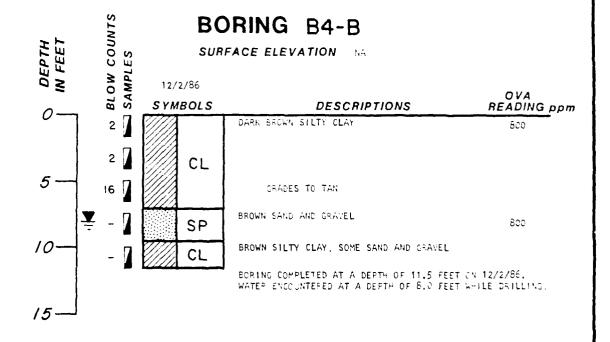


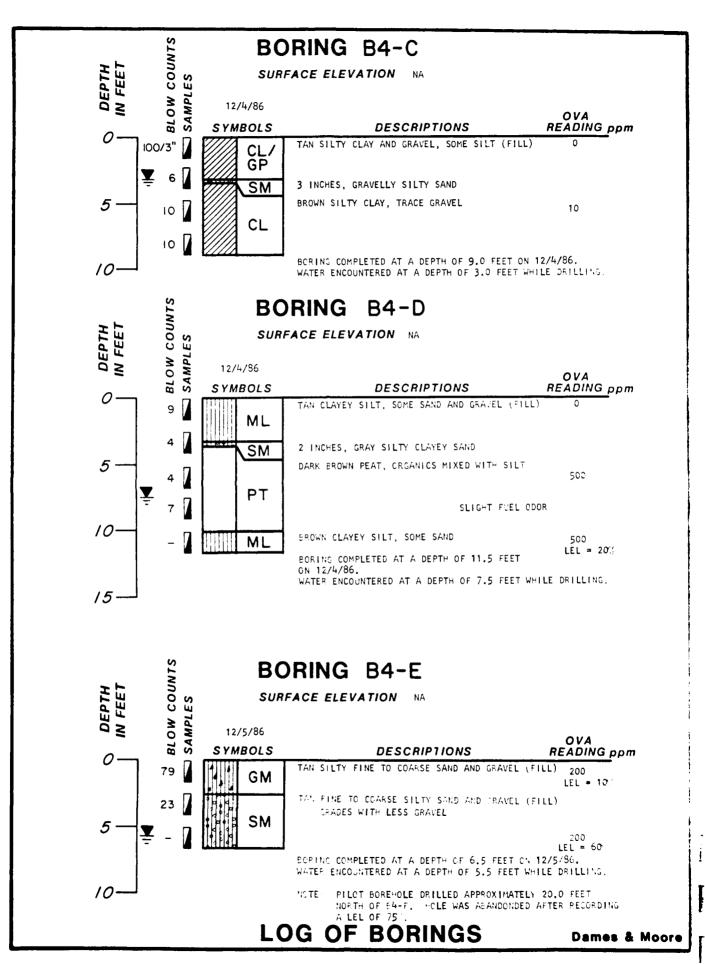


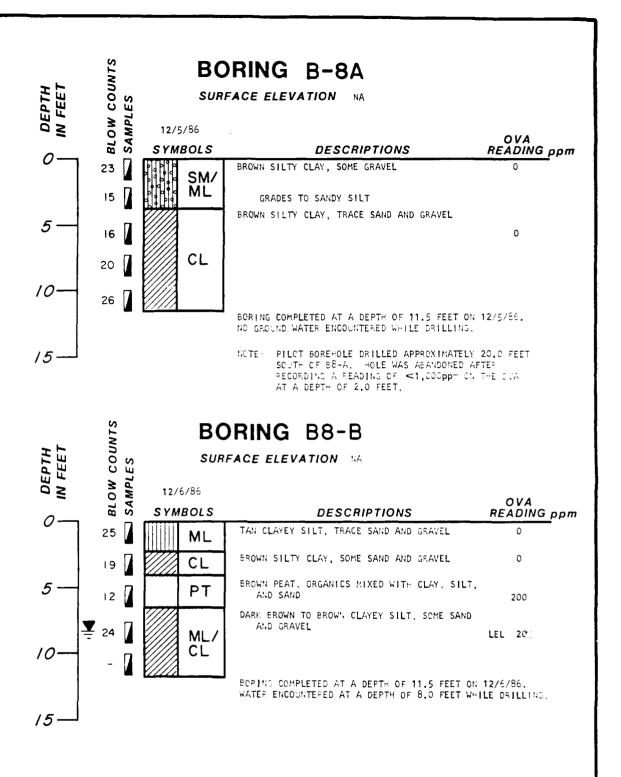












MONITOR WELL INFORMATION SHEET							
GROUND SURFACE ELEVATION 143	35.06 JOB NUMBER 1016-267						
TOP OF WELL CASING ELEVATION	5.06 JOB NUMBER 1016-267 7.67 BORING NUMBER GW 2-A						
	DATE 11/13/86						
	LOCATION PULLTH LAPMA						
98 17	DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE FEET. *						
THE WELL SHOOT OF THE PARTY OF	2 DEPTH TO BOTTOM OF SEAL (IF INSTALLED) FEET. *						
	DEPTH TO TOP OF SEAL (IF INSTALLED) FEET.*						
	4 LENGTH OF WELL SCREEN 10,0 FEET. SLOT SIZE 0.010						
$\bigcup_{i \in \mathcal{I}} \nabla_{i}(i) $	5 TOTAL LENGTH OF PIPE 14.11 FEET AT INCH DIAMETER.						
5) 10)	TYPE OF PACK AROUND WELL POINT OR SLOTTED						
	(CIRCLE ONE)						
15)	8 HEIGHT OF WELL CASING ABOVE GROUND 2.61 FEET.						
3	PROTECTIVE CASING? HEIGHT ABOVE GROUND TEET. LOCKING CAP? YES NO (CIRCLE ONE)						
(2)	TYPE OF UPPER BACKFILL						
	11) BOREHOLE DIAMETER 5 INCHES.						
4 6 6	12 DEPTH TO GROUND WATER 2.5 FEET. *						
16	13 TOTAL DEPTH OF BOREHOLE 12.5 FEET.*						
	14) TYPE OF LOWER BACKFILL						
(1775) (1775) (1775) (1775)	15) PIPE MATERIAL Stainles steel						
14	(5) PIPE MATERIAL Stainles steel (16) SCREEN MATERIAL tainles Steel						
	*(DEPTH FROM GROUND SURFACE)						
[13]							
М	ONITOR WELL INSTALLATION DETAILS						

1016-267 JOB NUMBER GROUND SURFACE ELEVATION BORING NUMBER GW-ZB TOP OF WELL CASING ELEVATION · Pulth IAP MN LOCATION DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 12.5 FEET. * DEPTH TO BOTTOM OF SEAL (IF INSTALLED) DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.* 4 LENGTH OF WELL SCREEN 10 FEET. (11) TOTAL LENGTH OF PIPE 14.91 FEET AT 2 INCH DIAMETER. 5 TYPE OF PACK AROUND WELL POINT OR SLOTTED (7) CONCRETE CAP. YES <u>NO</u> (CIRCLE ONE) HEIGHT OF WELL CASING ABOVE GROUND 2.41 FEET. NO (CIRCLE ONE) PROTECTIVE CASING? HEIGHT ABOVE GROUND LOCKING CAP? NO (CIRCLE ONE) (10) TYPE OF UPPER BACKFILL GWOUT (11) BOREHOLE DIAMETER___ (12) DEPTH TO GROUND WATER 2.0 FEET. * 6 (13) TOTAL DEPTH OF BOREHOLE 15.0 FEET.* 16 (14) TYPE OF LOWER BACKFILL_ (15) PIPE MATERIAL Stander Stock (16) SCREEN MATERIAL Starlen Steel 14 * (DEPTH FROM GROUND SURFACE) 13 MONITOR WELL INSTALLATION DETAILS

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION	1436,17	JOB NUMBER	1016-267
TOP OF WELL CASING ELEVATION	1438,55	BORING NUMBER	6W-2C
		DATE	11/14/86
		LOCATION .	Duloth VAP, MN
98) 0EPTH PIPE_	TO BOTTOM OF WELL 21.5 FEET.	POINT OR SLOTTED *
1000 0000 0000 0000 0000 0000 0000 000		TO BOTTOM OF SEAL	(IF INSTALLED)
	3 DEPTH	TO TOP OF SEAL (1	F INSTALLED)
	4 LENGT	H OF WELL SCREEN_ SIZE O. O.O	. 15 FEET.
$\begin{array}{c c} & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & & \\ & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & &$	5 TOTAL	LENGTH OF PIPE INCH DIAMETER.	Z 3. CO FEET AT
5) 10	` -	OF PACK AROUND WEL	L POINT OR SLOTTED
	_	ETE CAP.	NO (CIRCLE ONE)
15	8 HE1GH	T OF WELL CASING A	NBOVE GROUND
3	(9) нетсн	CTIVE CASING? T ABOVE GROUND NG CAP?	MO (CIRCLE ONE) FEET. NO (CIRCLE ONE)
2		OF UPPER BACKFILL	grout.
	(II) BOREH	OLE DIAMETER	5 INCHES.
4	12 DEPTH	TO GROUND WATER_	6.0 FEET. *
16) (13) TOTAL	. DEPTH OF BOREHOL!	21.5 FEET.*
		OF LOWER BACKFILL	
	(15) PIPE	MATERIAL STAIN L EN MATERIAL STAIN	in stal
14	16 SCREE	EN MATERIAL STUM	Lan Stay
		FROM GROUND SURFA	CE)
The same of the sa			

MONITOR WELL INFORMATION SHEET

MONITOR WELL INSTALLATION DETAILS

MONITOR WELL INFORMATION SHEET 1016-267 1427,78 GROUND SURFACE ELEVATION JOB NUMBER GW2-D TOP OF WELL CASING ELEVATION BORING NUMBER 1117 186 Duluth IAPMN LOCATION DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 72.5 FEET.* DEPTH TO BOTTOM OF SEAL (IF INSTALLED) LENGTH OF WELL SCREEN 15 FEET. SLOT SIZE 0.610 (11) TOTAL LENGTH OF PIPE 24.27 FEET AT 2 INCH DIAMETER. <u>V</u>(12) 5 6 PIPE Sand WELL POINT OR SLOTTED (7) CONCRETE CAP. NO (CIRCLE ONE) 8 HEIGHT OF WELL CASING ABOVE GROUND 1.77 FEET. MO (CIRCLE ONE) PROTECTIVE CASING? (9) HEIGHT ABOVE GROUND (CIRCLE ONE) LOCKING CAP? (10) TYPE OF UPPER BACKFILL GOVOVE. (1) BOREHOLE DIAMETER 5 INCHES. 6 (12) DEPTH TO GROUND WATER 10 . O FEET. * (13) TOTAL DEPTH OF BOREHOLE 23 0 FEET.* 16 (14) TYPE OF LOWER BACKFILL_____ (15) PIPE MATERIAL Stanley steel (16) SCREEN MATERIAL STUILLES STUL

MONITOR WELL INSTALLATION DETAILS

*(DEPTH FROM GROUND SURFACE)

Dames & Moore

[13]

MONITOR WELL INFORMATION SHEET GROUND SURFACE ELEVATION 1426,25 JOB NUMBER 1016-267 TOP OF WELL CASING ELEVATION BORING NUMBER GW-ZE DATE LOCATION .. Duluth IAP, MA DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 14.0 FEET. * 2 DEPTH TO BOTTOM OF SEAL (IF INSTALLED) FEET.* 3 DEPTH TO TOP OF SEAL (IF INSTALLED) FEET.* LENGTH OF WELL SCREEN 10.0 FEET. (11)5 TOTAL LENGTH OF PIPE 19,93 FEET AT INCH DIAMETER. <u>V</u>(12) 5 6 TYPE OF PACK AROUND WELL POINT OR SECTION PIPE 1) CONCRETE CAP. YES NO (CIRCLE ONE) B HEIGHT OF WELL CASING ABOVE GROUND O.93 FEET. 9 PROTECTIVE CASING? HEIGHT ABOVE GROUND_ LOCKING CAP? NO (CIRCLE ONE) NO (CIRCLE ONE) 10 TYPE OF UPPER BACKFILL AND 11) BOREHOLE DIAMETER____ 12 DEPTH TO GROUND WATER 10,75 FEET. * (13) TOTAL DEPTH OF BOREHOLE 19.0 FEET.* (14) TYPE OF LOWER BACKFILL ____ (15) PIPE MATERIAL Stainles stal 16 SCREEN MATERIAL Staller sterly *(DEPTH FROM GROUND SURFACE) [13]MONITOR WELL INSTALLATION DETAILS

MONITOR WELL INFORMATION SHEET 1421,25 1016-24.7 JOB NUMBER GROUND SURFACE ELEVATION 1423.84 TOP OF WELL CASING ELEVATION BORING NUMBER DATE LOCATION DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE_16.5 FEET.* DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 4 LENGTH OF WELL SCREEN DEST. (11) 5 TOTAL LENGTH OF PIPE 19.09 FEET AT 2 INCH DIAMETER. <u>√</u>(12) 5 TYPE OF PACK AROUND WELL POINT OR SLOTTED (7) CONCRETE CAP. NO (CIRCLE ONE) (15) 8 HEIGHT OF WELL CASING ABOVE GROUND PEET. MO (CIRCLE ONE) PROTECTIVE CASING? (9) HEIGHT ABOVE GROUND LOCKING CAP? (CIRCLE ONE) (10) TYPE OF UPPER BACKFILL Grant 2 5___INCHES. 11 BOREHOLE DIAMETER____ (12) DEPTH TO GROUND WATER ~12.0 FEET. * 6 4 (13) TOTAL DEPTH OF BOREHOLE 17, 0 FEET.* [16] (14) TYPE OF LOWER BACKFILL___ (15) PIPE MATERIAL Steel Steel (16) SCREEN MATERIAL Steel [14] * (DEPTH FROM GROUND SURFACE) (13)MONITOR WELL INSTALLATION DETAILS

MONITOR WELL INFORMATION SHEET 1418.92 1016-267 JOB NUMBER GROUND SURFACE ELEVATION BORING NUMBER GN3-B TOP OF WELL CASING ELEVATION 12/1/86 DATE IAP, MN LOCATION 1 DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 20.0 FEET. * $\left[7\right]$ DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 3 DEPTH TO TOP OF SEAL (IF INSTALLED) LENGTH OF WELL SCREEN 15.0 FEET. (11) TOTAL LENGTH OF PIPE 22.34 FEET AT 2 INCH DIAMETER. <u></u> [12) 5 TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE______. (7) CONCRETE CAP. <u>00</u> (CIRCLE ONE) B HEIGHT OF WELL CASING ABOVE GROUND 1.34 FEET. PROTECTIVE CASING? <u>no</u> (CIRCLE ONE) FEET. HEIGHT ABOVE GROUND LOCKING CAP? (CIRCLE ONE) 10 TYPE OF UPPER BACKFILL ON T 2) (1) BOREHOLE DIAMETER __INCHES. 12 DEPTH TO GROUND WATER 4 6 (13) TOTAL DEPTH OF BOREHOLE ZU. U FEET.* [16] (14) TYPE OF LOWER BACKFILL_____ (15) PIPE MATERIAL Stainlen Stail (16) SCREEN MATERIALSTA Lun steil 14 * (DEPTH FROM GROUND SURFACE) (13)MONITOR WELL INSTALLATION DETAILS

MONITOR WELL INFORMATION SHEET 1016-267 1417,97 JOB NUMBER GROUND SURFACE ELEVATION TOP OF WELL CASING ELEVATION BORING NUMBER LOCATION . DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 19.0 FEET. * 7 DEPTH TO BOTTOM OF SEAL (IF INSTALLED) DEPTH TO TOP OF SEAL (IF INSTALLED) _______FEET.* LENGTH OF WELL SCREEN 10.0 FEET. SLOT SIZE 0,010. [11] 5 TOTAL LENGTH OF PIPE 20.5 FEET AT 5 TYPE OF PACK AROUND WELL POINT OR SLOTTED 10 (7) CONCRETE CAP. (YES) NO (CIRCLE ONE) (15) HEIGHT OF WELL CASING ABOVE GROUND [3]9 PROTECTIVE CASING? HEIGHT ABOVE GROUND LOCKING CAP? NO (CIRCLE ONE) (CIRCLE ONE) (10) TYPE OF UPPER BACKFILL CANAL (1) BOREHOLE DIAMETER 5 INCHES. 6 (12) DEPTH TO GROUND WATER 3, 0 FEET. * (13) TOTAL DEPTH OF BOREHOLE 19.0 FEET.* [16](14) TYPE OF LOWER BACKFILL___ 1 (15) PIPE MATERIAL String Lan steel (16) SCREEN MATERIAL STEIL Lan Sterl (14)* (DEPTH FROM GROUND SURFACE) [13]

MONITOR WELL INSTALLATION DETAILS

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION

(11)

5

1416.23

1016-267 JOB NUMBER BORING NUMBER GW3-D

LOCATION DULL HAP MN



<u></u>

12)

(15)

6

[16]

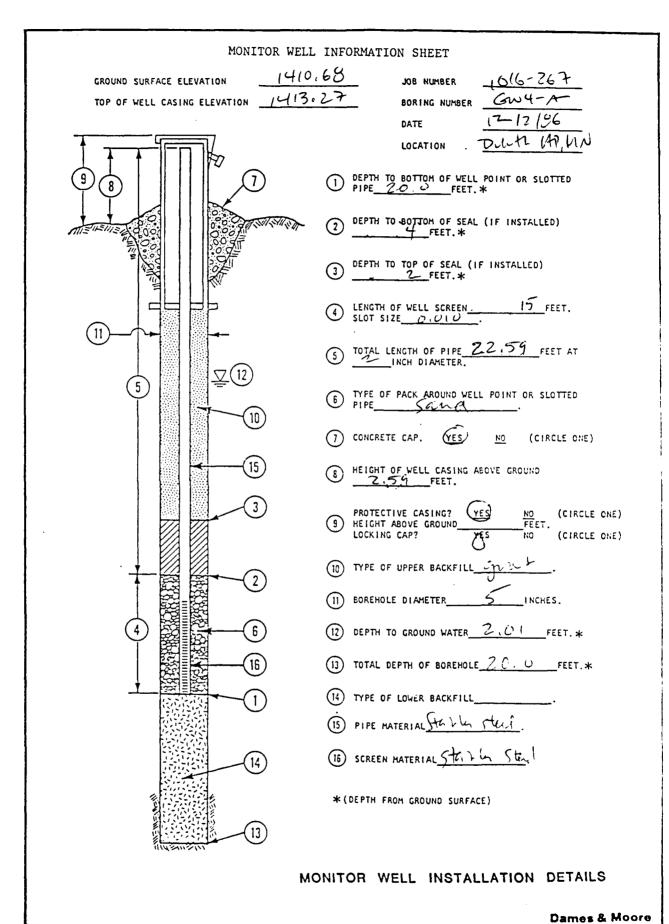
[13]

- 1 DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 19 G D FEET.*
- DEPTH TO BOTTOM OF SEAL (IF INSTALLED)

 2 2 FEET.*
- DEPTH TO TOP OF SEAL (IF INSTALLED)
- (4) LENGTH OF WELL SCREEN 15.0 FEET.
- 5 TOTAL LENGTH OF PIPE 20.25 FEET AT 2 INCH DIAMETER.
- TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
- 7 CONCRETE CAP. (PES) (CIRCLE ONE) NO
- 8 HEIGHT OF WELL CASING ABOVE GROUND L. 35 FEET.
- 9 PROTECTIVE CASING?
 HEIGHT ABOVE GROUND_
 LOCKING CAP? NO (CIRCLE ONE) (CIRCLE ONE)
- 10 TYPE OF UPPER BACKFILL Go u.
- (1) BOREHOLE DIAMETER 5 INCHES.
- (12) DEPTH TO GROUND WATER 3 41 FEET. *
- (13) TOTAL DEPTH OF BOREHOLE 189 FEET.*
- (14) TYPE OF LOWER BACKFILL_____
- (15) PIPE MATERIAL Stanler Stanl
- (16) SCREEN MATERIALS to New steel

* (DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS



D-33

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION

TOP OF WELL CASING ELEVATION

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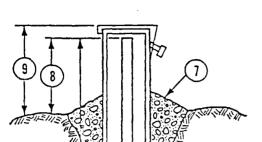
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1409.83

JOB NUMBER (016-267)
BORING NUMBER COW4-B

DATE 12/3/66

Duluth LADMA



∑(12)

15

3

2

8)

(16)

[14]

 $\overline{13}$

DEPTH TO BOTTOM OF WELL POINT OR SLOTTED

LOCATION .

- 2 DEPTH TO BOTTOM OF SEAL (IF INSTALLED)
- DEPTH TO TOP OF SEAL (IF INSTALLED)

 2 FEET.*
- LENGTH OF WELL SCREEN SLOT SIZE O.O(O).
- 5 TOTAL LENGTH OF PIPE 22.42 FEET AT _____INCH DIAMETER.
- TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE______.
- 1 CONCRETE CAP. (YES
- NO (CIRCLE ONE)
- 8 HEIGHT OF WELL CASING ABOVE GROUND 2.42 FEET.
- PROTECTIVE CASING? (CIRCLE ONE)
 HEIGHT ABOVE GROUND (CIRCLE ONE)
 LOCKING CAP? (CIRCLE ONE)
- 10 TYPE OF UPPER BACKFILL
- 11 BOREHOLE DIAMETER _____ INCHES.
- 12 DEPTH TO GROUND WATER 2.9 FEET. *
- 13 TOTAL DEPTH OF BOREHOLE 20.0 FEET.*
- 14 TYPE OF LOWER BACKFILL ______.
- (15) PIPE MATERIAL STRINGE STEND
- (16) SCREEN MATERIAL Stribb Steel

* (DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

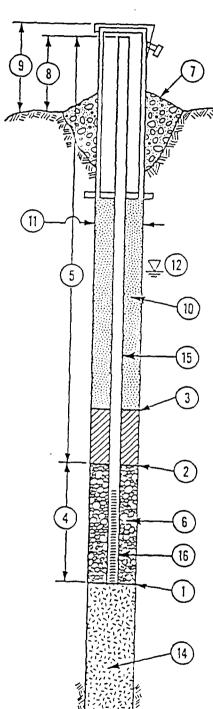
MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1413.59

TOP OF WELL CASING ELEVATION 1416.29

BORING NUMBER 6504-C

DATE 1213166



DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 200 S FEET.*

LOCATION .

Duluth IMP HIS

- 2 DEPTH TO BOTTOM OF SEAL (IF INSTALLED)

 SO FEET.*
- 3 DEPTH TO TOP OF SEAL (IF INSTALLED)
- LENGTH OF WELL SCREEN () FEET.
- 5 TOTAL LENGTH OF PIPE 22.7 FEET AT ______ INCH DIAMETER.
- TYPE OF PACK AROUND WELL POINT OR SLOTTED
- 1 CONCRETE CAP. MES NO (CIRCLE ONE)
- 8 HEIGHT OF WELL CASING ABOVE GROUND
 2.7 FEET.
- 9 PROTECTIVE CASING? VES NO (CIRCLE ONE)
 LOCKING CAP? VES NO (CIRCLE ONE)
- 10 TYPE OF UPPER BACKFILL TO
- 11) BOREHOLE DIAMETER SINCHES.
- 12) DEPTH TO GROUND WATER 7 FEET. *
- 13 TOTAL DEPTH OF BOREHOLE 20.0 FEET.*
- 14) TYPE OF LOWER BACKFILL______
- 15 PIPE MATERIALStructor (VER.
- 16 SCREEN MATERIAL Stive, Steel
- * (DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

MONITOR WELL INFORMATION SHEET 1414.62 GROUND SURFACE ELEVATION JOB NUMBER TOP OF WELL CASING ELEVATION _ BORING NUMBER DATE LOCATION . DULLE 1,47 MU DEPTH TO BOITON OF WELL POINT OR SLOTTED PIPE 75.3 FEET. * DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 18.0 FEET.* DEPTH TO TOP OF SEAL (IF INSTALLED) FEET.* 4 LENGTH OF WELL SCREEN 10 FEET. (11) 5 TOTAL LENGTH OF PIPE 27.55 FEET AT 2 INCH DIAMETER. <u></u> ✓ (12) 5 TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE ______. 7) CONCRETE CAP. YES <u>N0</u> (CIRCLE ONE) (15) B HEIGHT OF WELL CASING ABOVE GROUND 2.55 FEET. NO (CIRCLE ONE) PROTECTIVE CASING? HEIGHT ABOVE GROUND_ (CIRCLE ONE) LOCKING CAP? 10 TYPE OF UPPER BACKFILL CANY (1) BOREHOLE DIAMETER_ 6 (12) DEPTH TO GROUND WATER 6 C FEET. * (13) TOTAL DEPTH OF BOREHOLE 25.0 FEET.* (14) TYPE OF LOWER BACKFILL _____ 15 PIPE MATERIAL OKINGE STEEL 16 SCREEN MATERIALS TO STEE * (DEPTH FROM GROUND SURFACE) [13] MONITOR WELL INSTALLATION DETAILS

MONITOR WE	LL INFORMATION SHEET
	2.62 JOB NUMBER 61016-267
TOP OF WELL CASING ELEVATION 141	4.36 BORING NUMBER _GWEX
	DATE 12/6/86
	LOCATION . DICTE 1.47 14,0
	DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 13.0 FEET. *
	DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 7.6 FEET.*
	3 DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.*
	LINGTH OF WELL SCREEN 10 FEET.
	5 TOTAL LENGTH OF PIPE 14.74 FEET AT NICH DIAMETER.
(5)	B TYPE OF PACK AROUND WELL POINT OR SLOTTED
	7 CONCRETE CAP. YES NO (CIRCLE ONE)
(15)	8 HEIGHT OF WELL CASING ABOVE GROUND
3	PROTECTIVE CASING? YEE NO (CIRCLE ONE) HEIGHT ABOVE GROUND FEET. LOCKING CAP? NO (CIRCLE ONE)
2	10 TYPE OF UPPER BACKFILL
	11) BOREHOLE DIAMETERINCHES.
	12) DEPTH TO GROUND WATER 3.0 FEET. *
16	13) TOTAL DEPTH OF BOREHOLE 13.0 FEET.*
	14) TYPE OF LOWER BACKFILL
	15) PIPE MATERIAL Status Heil 16) SCREEN MATERIAL Status Place
14)	(16) SCREEN MATERIAL States Place
13	*(DEPTH FROM GROUND SURFACE)
í	MONITOR WELL INSTALLATION DETAILS

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MONITOR WELL INFORMATION SHEET

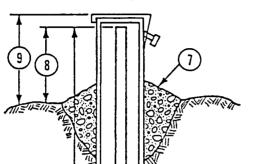
GROUND SURFACE ELEVATION __
TOP OF WELL CASING ELEVATION

1412.15

DATE 12/6/86

LOCATION DUMBER 1016-267

LOCATION DUMBER 12/6/86



<u>V</u>(12)

3

6

16

14

[13]

[11]

5

- DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 70.0 FEET.*
- DEPTH TO BOTTOM OF SEAL (IF INSTALLED)

 FEET.*
- 3 DEPTH TO TOP OF SEAL (IF INSTALLED)
- 4 LENGTH OF WELL SCREEN (O FEET. SLOT SIZE O. O.O.
- 5 TOTAL LENGTH OF PIPE 22.81 FEET AT 2 INCH DIAMETER.
- TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
- 7 CONCRETE CAP. YES NO (CIRCLE ONE)
- B HEIGHT OF WELL CASING ABOVE GROUND PEET.
- 9 PROTECTIVE CASING? YES NO (CIRCLE ONE)
 LOCKING CAP? (TES NO (CIRCLE ONE)
- 10 TYPE OF UPPER BACKFILL TO THE .
- 1) BOREHOLE DIAMETER 5 INCHES.
- (12) DEPTH TO GROUND WATER 2.95 FEET. *
- 13 TOTAL DEPTH OF BOREHOLE 20.0 FEET.*
- 14 TYPE OF LOWER BACKFILL
- 15 PIPE MATERIALS tricken steet.
- 16 screen material Stringen Strik.

* (DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION TOP OF WELL CASING ELEVATION

1413.22 1415.97

1016-267 JOB NUMBER BORING NUMBER GWEC

DATE

LOCATION

. Puloth 120 Mi



- 1 DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 18.0 FEET. *
- DEPTH TO BOTTOM OF SEAL (IF INSTALLED)
 FEET,*
- DEPTH TO TOP OF SEAL (IF INSTALLED)
- LENGTH OF WELL SCREEN () FEET.
- TOTAL LENGTH OF PIPE 20.75 FEET AT 2 INCH DIAMETER.
- TYPE OF PACK AROUND WELL POINT OR SLOTTED
- (7) CONCRETE CAP. NO (CIRCLE ONE)
- HEIGHT OF WELL CASING ABOVE GROUND
- NO (CIRCLE ONE) PROTECTIVE CASING? (9) HEIGHT ABOVE GROUND LOCKING CAP? (CIRCLE ONE)
- (10) TYPE OF UPPER BACKFILL an ut.
- (1) BOREHOLE DIAMETER__
- (12) DEPTH TO GROUND WATER 3.6 FEET. *
- 14 TYPE OF LOWER BACKFILL
- (15) PIPE MATERIAL Stanlin stais
- (16) SCREEN MATERIAL Strink steel
- * (DEPTH FROM GROUND SURFACE)

[11] 5 [15] (2)[6] 16 1 14 13

MONITOR WELL INSTALLATION DETAILS

MONITOR WELL INFORMATION SHEET 1407.90 1016-267 JOB NUMBER GROUND SURFACE ELEVATION 1411,06 BORING NUMBER GOULD A TOP OF WELL CASING ELEVATION Duch would LOCATION 3 DEPTH TO TOP OF SEAL (IF INSTALLED) LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010. 11 TOTAL LENGTH OF PIPE 22.66 FEET AT ______INCH DIAMETER. 5 TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE 7 CONCRETE CAP. YES (CIRCLE ONE) HEIGHT OF WELL CASING ABOVE GROUND 3.16 FEET. PROTECTIVE CASING? (YES HEIGHT ABOVE GROUND MO (CIRCLE ONE) FEET. (CIRCLE ONE) LOCKING CAP? 10 TYPE OF UPPER BACKFILL (1) BOREHOLE DIAMETER 5 INCHES. (12) DEPTH TO GROUND WATER ~ (O FEET. * 6 (13) TOTAL DEPTH OF BOREHOLE 70.0 FEET.* 16 (14) TYPE OF LOWER BACKFILL_______. (15) PIPE MATERIAL Stanton start 16 SCREEN MATERIAL HELLE LE STELL *(DEPTH FROM GROUND SURFACE)

Dames & Moore

MONITOR WELL INSTALLATION DETAILS

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION
TOP OF WELL CASING ELEVATION

11

1408.02

THE WAY

JOB NUMBER 1016-267

BORING NUMBER 6200-B

DATE 12/11/86

DATE

LOCATION

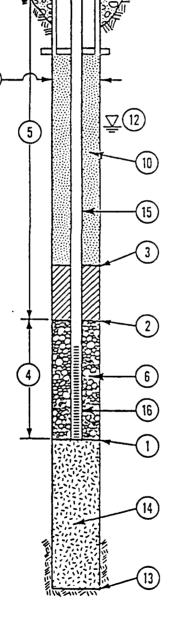
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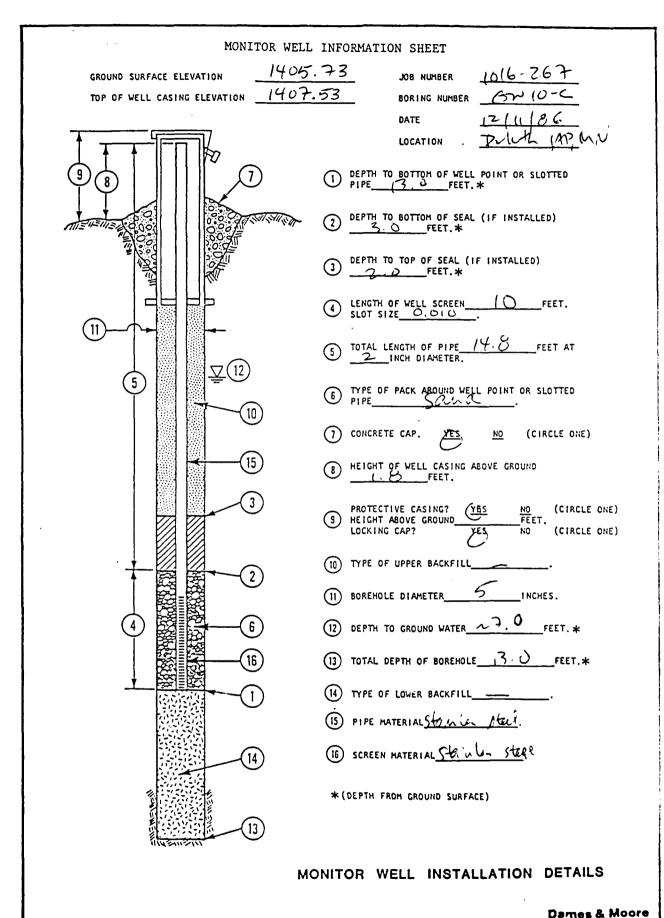
- DEPTH TO BOTTOM OF SEAL (IF INSTALLED)

 2 D FEET.*
- DEPTH TO TOP OF SEAL (IF INSTALLED)

 TEET.*
- LENGTH OF WELL SCREEN LD FEET.
- 5 TOTAL LENGTH OF PIPE 15,07 FEET AT 2 INCH DIAMETER.
- TYPE OF PACK AROUND WELL POINT OR SLOTTED
- 7 CONCRETE CAP. (CIRCLE ONE)
- 8 HEIGHT OF WELL CASING ABOVE GROUND Z.OF FEET.
- PROTECTIVE CASING? YES MO (CIRCLE ONE)
 HEIGHT ABOVE GROUND YES NO (CIRCLE ONE)
- 10 TYPE OF UPPER BACKFILL on wh
- (1) BOREHOLE DIAMETER 5 INCHES.
- (12) DEPTH TO GROUND WATER ~ 8. 0 FEET. *
- 13 TOTAL DEPTH OF BOREHOLE 13 FEET.*
- 14 TYPE OF LOWER BACKFILL______.
- (15) PIPE MATERIAL Stenton Stend.
- 16 SCREEN MATERIAL Stoin Stal
- * (DEPTH FROM GROUND SURFACE)



MONITOR WELL INSTALLATION DETAILS



D - 43

APPENDIX E
FIELD RAW DATA

WELL NO. <u>GW-IA</u> STABILIZATION TEST DATE: <u>12/10/86</u> TIME: <u>0947</u>

		WELL VOLUME EXTRACTED											
PARAMETER	1	2	3	4	5	6	7	8	9	10			
Field Conductivity: µmhos/cm	160	190	200	215									
pH: <u>+</u> 0.1 pH unit	6.0	6.5	7.0	7.1									
Temperature: ± 0.5°C	8.0	8.1	8.5	8.7					-				
Color	boun	same	same	same						=			
Odor of Discharge	nine	none	none	none									

WELL NO. <u>GW-IC</u> STABILIZATION TEST

DATE: 12/11/86 TIME: 1345

	WELL VOLUME EXTRACTED									
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	208	220	218							•
pH: <u>+</u> 0.1 pH unit	6.2	6.2	6.1							
Temperature: + 0.5°C	7.0	7.0	7.0						-	
Color	brown cloudy	same	same							
Odor of Discharge	none	none	none							

WELL NO. GW-ID STABILIZATION TEST

DATE: 12/15/86 TIME: 1202

	WELL VOLUME EXTRACTED									
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: 	131	133	134						·	
pH: + 0.1 pH unit	6.4	6.4	6.4							
Temperature: ± 0.5°C	6.9	7.0	7.0							
Color	red brown	same	same							:
Odor of Discharge	slight oil odor									

WELL NO. <u>GW-IE</u> STABILIZATION TEST

DATE: 12/15/86 TIME: 0940

		WELL VOLUME EXTRACTED								
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	239	220	213						·	
pH: + 0.1 pH unit	6.8	7.2	7.1							
Temperature: + 0.5°C	7.9	7.8	7.5						·	
Color	red- brown	same	light brown							:
Odor of Discharge			none							

WELL NO. <u>GW-ZA</u> STABILIZATION TEST

DATE: 1/1/87 TIME: 1436

	WELL VOLUME EXTRACTED												
PARAMETER	1	2	3	4	5	6	7	8	9	10			
Field Conductivity: µmhos/cm	212	218	222						·				
pH: + 0.1 pH unit	5.1	5.8	5.9	5.9									
Temperature: + 0.5°C	3.5	4.0	4.2										
Color	red brown	Sand	same							-			
Odor of Discharge	hent	nme	none										

WELL NO. 6W-2B STABILIZATION TEST

DATE: 1/2/87 TIME: 0854

		WELL VOLUMÉ EXTRACTED									
PARAMETER	1	2	3	4	5	6	7	8	9	10	
Field Conductivity: 	380	375	380	385					·		
pH: <u>+</u> 0.1 pH unit	6.1	6.45	6.5	6.5							
Temperature: <u>+</u> 0.5°C	3.2	2.9	3.0	3.0							
Color	light brown	same	same	samp						-	
Odor of Discharge	none		state	same							

WELL NO. 6W-2C STABILIZATION TEST

DATE: 1/2/87 TIME: 1003

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: Junhos/cm	91	98	90							
pH: + 0.1 pH unit	5.4	5.7	5.35							
Temperature: ± 0.5°C	7.0	6.5	6.5							
Color	eight brown	Same	same							-
Odor of Discharge	none	same	same							

WELL NO. <u>GW2-D</u> STABILIZATION TEST

DATE: 1/2/27 TIME: 1456

		WELL VOLUME EXTRACTED									
PARAMETER	1	2	3	4	5	6	7	8	9	10	
Field Conductivity:	482	505	505	505							
pH: <u>+</u> 0.1 pH unit	5.85	6.0	6.0	6.0				,			
Temperature: ± 0.5°C	7.0	7.1	7.1								
Color	eight brown	Same	same							-	
Odor of Discharge	sweet	same	same								

WELL NO. GW-2E STABILIZATION TEST

DATE: 1/3/87 TIME: 093/

				WELL	VOLUM	E EXTR	ACTED		WELL VOLUME EXTRACTED									
PARAMETER	1	2	3	4	5	6	7	8	9	10								
Field Conductivity: 	950	950	930	930														
pH: + 0.1 pH unit	6.0	6.2	6.2	6.2		-												
Temperature: ± 0.5°C	6.4	7.0	6.8	6.8														
Color	light brown	same	Same	Same						-								
Odor of Discharge	sweet	Same	same	Same														

WELL NO. 6W3A STABILIZATION TEST

DATE: 1/6/87 TIME: 0833

		WELL VOLUME EXTRACTED									
PARAMETER	1	2	3	4	5	6	7	8	9	10	
Field Conductivity: 	120	110	113	(1)							
pH: <u>+</u> 0.1 pH unit	6.69	6.3	6.30	6.30							
Temperature: + 0.5°C	5.8	5.9	5.8	5.3							
Color	red - brown, Silty	Same	same	same						-	
Odor of Discharge	none	noni	none	none							

WELL NO. GW-3B STABILIZATION TEST

DATE: 1/6/87 TIME: 1234

		WELL VOLUME EXTRACTED									
PARAMETER	1	2	3	4	5	6	7	8	9	10	
Field Conductivity: µmhos/cm	459	471	468	469							
pH: <u>+</u> 0.1 pH unit	5.8	5.9	6.0	5.9							
Temperature: <u>+</u> 0.5°C	6.8	6.8	6.4	6.8							
Color	eight brown	same	same	same						-	
Odor of Discharge	chemical	same	same	same							

WELL NO. 6W-3C STABILIZATION TEST

DATE: 1/6/87 TIME: 1000

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	238	210	236							
pH: + 0.1 pH unit	6.2	6.3	6.3							
Temperature: + 0.5°C	6.2	5.9	5.9							
Color	Light brown	same	Same							**
Odor of Discharge	none	none	hone							

WELL NO. GW-3D STABILIZATION TEST

DATE: 1/7/87 TIME: 1064

		_		WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: #mhos/cm	557	220	550	550						
pH: <u>+</u> 0.1 pH unit	6.1	6.35	6.45	6.51						
Temperature: <u>+</u> 0.5°C	6.0	7.0	6.5	6.5						
Color	dark	same	same	Same						
Odor of Discharge	chemical		same	Same		-				

WELL NO. <u>GW-4A</u> STABILIZATION TEST

DATE: 12/18/86 TIME: 1510

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	390	399	401							
рН: <u>+</u> 0.1 рН unit	6.5	6.4	6.4							
Temperature: <u>+</u> 0.5°C	5.9	6.1	6.3							
Color	brown	brown	i '				-			_
Odor of Discharge	sulfur	same	same	-						

WELL NO. <u>GW-4B</u> STABILIZATION TEST DATE: <u>12/19/86</u> TIME: <u>1319</u>

				WELL	VOLUM	EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity:	205	251	300	330	329					
pH: <u>+</u> 0.1 pH unit	7.3	6.7	6.5	63	6.3					
Temperature: ± 0.5°C	6.0	5.5	5.5	5.1	5.1					
Color	brown, slight red	same	same	same	same					-
Odor of Discharge	petro. oder	same	Same	Same	same					

WELL NO. <u>GW-4C</u> STABILIZATION TEST DATE: <u>12/19/86</u> TIME: <u>12.05</u>

				WELL	VOLUM	E EXTR	ACTED	<u> </u>		-
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	630	630	630							
pH: <u>+</u> 0.1 pH unit	6.8	6.9	6.9							
Temperature: ± 0.5°C	8.0	8.0	8.0						-	
Color	red brown cloudy	red brown								
Odor of Discharge	slight petro. oder	same								

WELL NO. GW-4D STABILIZATION TEST

DATE: 12/19/86 TIME: 0901

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: mhos/cm	471	750	760	800	800					
pH: <u>+</u> 0.1 pH unit	5.8	6.3	6.5	6.6	6.6					
Temperature: <u>+</u> 0.5°C	7.0	7.4	7.2	7.3	7.3					
Color	1									-
Odor of Discharge	5	slight petro. oder								

Note: 1st bailer, yellow-clear color; 2nd bailer, brown silt.

WELL NO. <u>GW-5A</u> STABILIZATION TEST

DATE: 12/17/86 TIME: 0831

	0851	0950	1042		VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	274	290	284							
pH: <u>+</u> 0.1 pH unit	6.8	6.8	6.7							
Temperature: + 0.5°C	7.0	8.0	7.5						-	
Color	dark red- brown	red brown clearing	same							=
Odor of Discharge	none	none	none							

Note: Very Slow recharge.

WELL NO. GW-5B STABILIZATION TEST

DATE: 12/15/86 TIME: 1524

	12/15 1551	,	0908	19al. WELL 0914	1 941. VOLUME 0421	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	212	385	461	435	438					
pH: <u>+</u> 0.1 pH unit	6.4	6.4	6.6	6.7	6.7					
Temperature: + 0.5°C	7.1	6.9	9.1	6.5	6.9					
Color	red- brown	same	light red brain clever	cleare						=
Odor of Discharge	none	none	hone	none	nont					

Note: Extremely slow recharge.

WELL NO. <u>GW-5C</u> STABILIZATION TEST

DATE: 12/16/86 TIME: 1158

	1230	1327	1450	WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	630	25 0	530							
pH: <u>+</u> 0.1 pH unit	6.4	6.6	6.8							
Temperature: + 0.5°C	8.2	11.0	8.1							
Color	dark brown	tan	tan clear							-
Odor of Discharge	none	hone	none							

Note: Slow recharger.

WELL NO. GW-7A STABILIZATION TEST

DATE: 12/16/86 TIME: 1105

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: 	103	98	105							
pH: <u>+</u> 0.1 pH unit	5.8	5.65	5.8							
Temperature: <u>+</u> 0.5°C	6.0	5.9	7.8							
Color	tan	light	ton							=
Odor of Discharge	none	hone	none							

WELL NO. <u>GW-7B</u> STABILIZATION TEST

DATE: 12/18/86 TIME: 0925

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	208	200	190							
pH: <u>+</u> 0.1 pH unit	6.6	6.6	6.7							
Temperature: + 0.5°C	6.1	6.0	6.3							
Color	rea- brown	Same	same							-
Odor of Discharge	none	nom	none							

Note: Rapid recharge.

WELL NO. <u>GW-7C</u> STABILIZATION TEST

DATE: 12/17/86 TIME: 1525

	12/17		12/18 0852	12/19 WELL 0802	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity:	358	385	345	360						
рН: <u>+</u> 0.1 рН unit	6.9	7.0	6.5	6.4						
Temperature: + 0.5°C	3.5	5.0	3.0	4.0						
Color	red - brown	Same	red brown clearer							-
Odor of Discharge	none	non	none	none						

Note: Extremely slow recharge. Recovers at approximate rate of 1ft./hour.

WELL NO. <u>GW-BA</u> STABILIZATION TEST DATE: <u>1/9/87</u> TIME: <u>1307</u>

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: mhos/cm	460	540	580	550	550					
pH: <u>+</u> 0.1 pH unit	6.1	6.3	6.4	6.49	6.50					
Temperature: + 0.5°C	6.8	6.0	6.2	5.9	5.9					
Color	dark gmy- brown		same	same	Same					
Odor of Discharge	slight Sweet	same	Same	same	same					

WELL NO. <u>6W-8B</u> STABILIZATION TEST

DATE: 1/7/87 TIME: 1202

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: 	412	395	372	357	35%					
рН: <u>+</u> 0.1 pH unit	6.7	6.6	6.6	6.6	6.5					
Temperature: ± 0.5°C	5.9	6.2	6.8	6.9	7.0					
Color	brown	Same	same	same	same					-
Odor of Discharge	home	none	none	none	none					

WELL NO. <u>GW-8C</u> STABILIZATION TEST

DATE: 1/9/87 TIME: 1445

		-		WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	487	540	950	540						
pH: <u>+</u> 0.1 pH unit	6.8	6.7	6.7	6.65						
Temperature: + 0.5°C	6.2	6.9	6.9	7.1					-	
Color	bown	same	same	same						-
Odor of Discharge	slight semage	same	same	same						

WELL NO. 6W-10A STABILIZATION TEST
DATE: 12/31/06 TIME: 1030

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	330	335	335	330						
pH: + 0.1 pH unit	6.0	6.2	6.2	6.25						
Temperature: + 0.5°C	6.01	6.8	6.5	6.8						
Color	light brown	Same	Same	same						-
Odor of Discharge	None	hona	none	none						

WELL NO. <u>6W-10B</u> STABILIZATION TEST
DATE: <u>1/1/87</u> TIME: <u>1053</u>

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	210	233	242	250	250					
рН: <u>+</u> 0.1 рН unit	5.8	6.1	6.23	6.2						
Temperature: ± 0.5°C	4.0	4.8	5.0	5.01						
Color	light brown	Same	same	Same						-
Odor of Discharge	hone	hone	hone	nme						

WELL NO. 6W-10C STABILIZATION TEST

DATE: 1/1/27 TIME: 1220

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	210	271	265	268						
pH: <u>+</u> 0.1 pH unit	6.01	6.2	6.25							
Temperature: + 0.5°C	4.8	5.0	5.01							
Color	lign+ brank	same	gray	same						-
Odor of Discharge	hone	none	none	none						

Note: Slow recharge.

WELL NO. MW-1 STABILIZATION TEST

DATE: 1/3/87 TIME: 1423

				WELL	. VOLUMI	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	485	600	620	680	630					
pH: <u>+</u> 0.1 pH unit	6.29	6.5	6.5	6.4	6.4					
Temperature: ± 0.5°C	7.2	7.8	7.6	8.0	8.0				-	
Color	light brown	same	Same	same	same					_
Odor of Discharge	313ht Sweet	Same	Same	same	same					

WELL NO. MW-2 STABILIZATION TEST

DATE: 1/3 /87 TIME: 1315

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	460	600	650	65 0						
pH: + 0.1 pH unit	6.1	6.32	6.3	6.3						
Temperature: + 0.5°C	6.8	7.0	7.0	7.0						
Color	yellow	same	same	same						_
Odor of Discharge	slight sweet	same	same	same						

WELL NO. MW-4 STABILIZATION TEST

DATE: 1/4/87 TIME: 12-53

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	355	365	3 83	39 /	398				·	
рН: <u>+</u> 0.1 рН unit	5.7	6.0	6.1	6.2						
Temperature: + 0.5°C	6.5	7.0	7.0	7.0						
Color	red brank	Same	Some	same						_
Odor of Discharge	stale	Same	same	same						

WELL NO. MW-5 STABILIZATION TEST

DATE: 1/4/87 TIME: 1029

				WELL	VOLUM	E EXTR	ACTED	· · · · ·		
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: mhos/cm	349	335	338							
pH: <u>+</u> 0.1 pH unit	6.6	7.0	7.3							
Temperature: + 0.5°C	7.0	6.8	7.5							
Color	red brown	same	dark brann							-
Odor of Discharge	stale	same	same							

Note: Bailed dry after \$6 gallons; slow recharge.

WELL NO. MW-6 STABILIZATION TEST

DATE: 14/87 TIME: 1523

	1530	-	1617		VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity:	380	410	405							
pH: + 0.1 pH unit	5.8	6.5	6.6							
Temperature: + 0.5°C	6.0	7.0	7.0							
Color	red brown	Same	same							_
Odor of Discharge	none	slight sweet		•						

Note: Slow recharge.

WELL NO. MW-7 STABILIZATION TEST

DATE: 1/5/87 TIME: 1434

	15		1/6	WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity:	365	402	392							
pH: + 0.1 pH unit	6.5	6.9	6.5							
Temperature: + 0.5°C	5.2	7.0	7.1							
Color	eight bown	gray	same							-
Odor of Discharge	nme	none	none							

Note: Extremely slow recharge.

WELL NO. MW-8 STABILIZATION TEST

DATE: 12/20/86 TIME: 0830

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity:	220	238	250	255	253					
pH: + 0.1 pH unit	5.8	5.9	6.0	6.0	6.1					
Temperature: + 0.5°C	6.5	7.2	8.0	8.0	8.0					
Color	tan	red brown, silty	same	Same	same					-
Odor of Discharge	hone	none	none	hone	nme					

well no. MW-9 stabilization test

DATE: 12/20/86 TIME: 1126

	1139	1300	1324		VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity:	471	460	450	455	_					
pH: <u>+</u> 0.1 pH unit	5.9	6.2	6.2	6.2						
Temperature: + 0.5°C	7.0	7.9	7.0	6.9						
Color	yellow- brown		brown	brown						-
Odor of Discharge	petro diesel ador									

Note: Slow recharge. Slight foaming during purging. WELL NO. MW-10 STABILIZATION TEST

DATE: 12/20/96 TIME: 1035

				WELL	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	430	420	429							
рН: <u>+</u> 0.1 рН unit	6.0	5.9	5.9							
Temperature: + 0.5°C	7.8	7.5	7.2							
Color	yellow- brown	brown- yellow								-
Odor of Discharge	strong petro. odor	Same	Same							

WELL NO. MW-II STABILIZATION TEST

DATE: 12/20/86 TIME: 1214

	1228	1253	1403	WELL 1542	VOLUM	E EXTR	ACTED			
PARAMETER	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	351	340	329	325						
pH: + 0.1 pH unit	7.1	7.1	6.8	6.8				_		
Temperature: + 0.5°C	(0.0	9.7	8.0	7.9						
Color	brawn	same	Same	same						=
Odor of Discharge	none	none	NONE	hone						

APPENDIX F

FIELD AND LABORATORY QUALITY CONTROL PROCEDURES

FIELD AND LABORATORY QUALITY CONTROL PROGRAMS

FIELD INVESTIGATION QUALITY CONTROL PROGRAM

The Technical Operations Plan (TOP) presented in Appendix M describes the methods and procedures that were used to accomplish the tasks defined during the Stage 2 investigation at Duluth IAP. Guidelines of the Occupational Safety and Health Administration (OSHA), United States Environmental Protection Agency (USEPA), and USAF, as well as previous investigations at Duluth IAP, were reviewed to select the methods that would be most appropriate for this investigation. The TOP is designed primarily to give guidance to personnel in the field and to ensure that standard methods of investigation are used.

LABORATORY QUALITY CONTROL PROGRAM

UBTL is an accredited laboratory of the American Industrial Hygiene (AIHA) Association (No. 17) and, as such, participates in an extensive interlaboratory proficiency analytical testing program sponsored by the National Institute for Occupational Safety and Health (NIOSH). In addition, UBTL is currently licensed by the Center for Disease Control (CDC) to perform chemical and clinical analyses of biological specimens and is State of Utah/USEPA approved for environmental analyses. The comprehensive internal quality control program at UBTL is detailed as follows.

Introduction

UBTL has implemented an effective system for Quality Control (QC) for samples analyzed from Duluth IAP. Procedures that are employed include:

- 1. Services of a full-time Quality Control/Quality Assurance Section;
- 2. Preparation of internal quality control samples;
- 3. Collection and evaluation of quality control data;
- 4. Generation of quality control charts; and
- 5. Instrument calibration and maintenance.

Sample Analyses

At least one blank sample and one reagent blank are included with each set of analyses and processed through the complete analytical procedure in order to detect any contamination in either collection media or reagents. In addition, duplicate analyses are accomplished on a minimum of 10 percent of all samples submitted from the field. Internal quality control samples, generated in the laboratory and containing known quantities of specified analyte(s), are run at the rate of 10 percent of the total field sample workload. At the completion of the analysis of a sample set, each chemist calculates his results and reports the results on the Analytical Report Form. Results for replicated samples and internal quality control samples are reported on the computer-generated Quality Control Data Sheet. Before the results are submitted to the Group Leader, another peer chemist analyst is assigned to check results for possible errors in the calculations. He must approve results reported on both the quality control sheet and the sample sheet. The Group Leader, after his evaluation of the data, gives the report sheets to the Quality Assurance Specialist (QAS) for his evaluation and implementation of any required action.

Specific steps are followed when any one QC sample result is determined to be out of control in connection with the analysis of a field sample set. QC charts with adjusted control limits of \pm 3 standard deviations will generally be used to determine whether a result is out of control. If QC results are in control, the QAS signs off the report. It is then reviewed by the Section Head for accuracy of the results. Upon final approval of the reports by the QAS and the Section Head, the reports are sent to the sponsor.

The paperwork containing the raw data for a sample set (i.e., chart paper, computer readouts, paper tapes, calibration curves, tables of data, etc.) is collected and placed in an $8\frac{1}{2}$ - by 11-inch envelope that has been labeled with sample numbers, analyst, date, and other pertinent information. The envelopes are filed by laboratory number for possible future reference and data retrieval. Raw data for each sample analysis are therefore readily available, if needed.

Quality Control Sample Data Analysis

A record of the preparation of internal QC samples is detailed in the QC log book maintained by the QAS. As appropriate, a set of QC samples is distributed to the chemist along with each sample set at an average rate of at least 10 percent of the submitted samples. The analyses and data evaluations are performed for these QC samples, along with the submitted samples, and results are tabulated on the computer-generated Quality Control Data Sheet. At least duplicate results are reported for each internal QC sample.

QC charts are generated for each analyte through the analysis of QC sample results. Each result is divided by the theoretical value to standardize results so that data from all concentrations can be directly compared for accuracy and precision. When a control data set of N sample results has been accumulated, the following statistics are calculated: mean percent recovery, replicate standard deviation, and set standard deviation. These statistics are then used to determine accuracy and precision QC limits.

The control data set is updated after evaluation of 20 successive QC samples and includes data on the 50 most recent results. Any control sample analysis that is beyond accuracy or precision limits is not used in the subsequent determination of new limits.

External Quality Control Programs

In addition to internally generated QC data, other information concerning QC is provided by the participation of UBTL in four interlaboratory QC programs: NIOSH Proficiency Analytical Testing (PAT) Program; two CDC Blood Lead QC Programs; and State of Utah Environmental Quality Control Program. The PAT Program and the CDC Blood Lead Programs involve the participation of more than 100 laboratories on a nationwide basis. The PAT Program addresses the analysis of filter samples for lead, cadmium, zinc, free silica, and asbestos and the analysis of charcoal tubes for various organic solvents.

Laboratory Data Reduction

A significant fraction of the Chemistry Department's work involves Mathematical models, based upon analysis of standard data processing. solutions or samples, are generated in order to determine the quantity of analyte present in the samples. Considerable time and effort are saved by the utilization of automated data processing procedures. Data processing by the computer can include, for example, calculations, generation of standard calibration curves, mathematical modeling of standard curves, statistical analyses, and the generation of hard copy output. Advantages intrinsic to the use of an automated system include more accurate calculations, immediate and accurate generation of data plots, fewer transcription errors, and no calculation errors after programs have been verified and documented. In general, the types of data that are processed are those derived from the following techniques: atomic absorption and flame emission spectroscopy, gas and liquid chromatography, optical absorbance spectrophotometry, specific ion electrode, fluorescence spectroscopy, and wet chemistry determinations. Similar functions are employed for QC data. In addition, the data system is utilized to store QC data, provide statistical analyses, and generate and update QC charts. The advantage of the provision for statistical analyses and the production of QC charts by automation is that the charts may be easily updated with minimal effort. QC data and any required action may, therefore, be provided on a daily basis.

Reporting Procedures

The analytical data are reported to the sponsor at the completion of each sample set. The report includes the following items:

1. A memorandum describing the sample set; the condition and appearance (i.e., homogeneity, integrity, etc.) of the samples upon receipt at UBTL; the method, equipment, and technique used in the determination; any interferences that were observed; and any unusual circumstances that may have occurred during the analysis. [The limit(s) of detection are also reported.]

- 2. UBTL Analytical Report Form, including field ID number, laboratory ID number, identification of the analytes, results of each determination, limit(s) of detection, and comments.
- 3. Other items, such as copies of strip chart recorder output, computer printout sheets, and other raw data (to be included as required).

Instrumentation

Each major equipment item at the UBTL Chemistry Department undergoes a routine preventive maintenance check on a regular schedule. This check is accomplished by a trained engineer. In addition, performance checks are made by the analyst prior to the analysis of each set of samples. This involves the analysis of one or more standards and a comparison of the values obtained with previous results and conditions. This information is recorded in an instrumentation log.

When an instrument or apparatus malfunctions and the problem is not readily corrected, the appropriate Section Head is notified. determined that a visit by the service representative is required, a service call is scheduled and the QAS is notified. Action by the service representative is recorded by the QAS in the Instrument Maintenance Log, and the appropriate customer field and service order forms are filed, by instrument, in the Instrument Maintenance Log Supplement File. In an effort to monitor and maintain instrument specifications, logs for each of the AA spectrophotometers, the gas chromatographs (GC), the X-ray diffractometer (X-ray), and the mass spectrometers (MS) have been provided for the analytical chemists' use each time an analysis is performed. The AA instrumentation logs contain entries for date, analyst, lamp number (if more than one lamp is available), standard concentration (recommended in manual), reading in milliabsorbence units, and a column for when instrumental parameters differ from the recommended conditions listed in the manual. The GC, X-ray, and MS logs contain entries for date, time, analyst, set identification number, and comments on parameters or performance.

<u>Training</u>

UBTL has established a continuing program of training of current personnel with respect to QC procedures. In addition, an intensive program for the training of recently recruited personnel in both analytical methods and techniques and QC policies has been implemented. It is the responsibility of the QAS and the Laboratory Director to train all laboratory personnel.

Results of the Laboratory QC Program

The results of the QC analyses for soil and ground water samples are presented in Appendix H, Analytical Reports.

In general, the laboratory QC program produced analyses of duplicate and spiked samples that were satisfactory. Details of the gas chromatographic columns are presented in the transmittal letter from UBTL in Appendix H.

One exception to the acceptable recovery of spike samples is noted in the QC data: the spike of toluene in soil from Sample B2-C, O to 1.5 feet. The recovery was 32 percent, in contrast to the range of 46 to 148 percent allowed by the USEPA Contract Laboratory Program contract.

The analyses of trip blanks indicate that the majority of the blanks were clean. The only exceptions were a concentration of 5.4 μ g/L of chloroform in Trip Blank, Site 7, and a concentration of 0.01 μ g/L of 4,4'-DDT in SW-8B. The concentration of chloroform in the trip blank is very similar to the detected concentration of 7.0 μ g/L in GW-7B; therefore, the reported concentration cannot be considered unequivocal. The presence of 4,4'-DDT in Trip Blank SW-8B presents a similar problem, as this compound is present in Sample SW-8B at the same concentration. This concentration, therefore, cannot be corroborated. For these reasons, these analyses were not taken into account for assessments at Sites 7 and 8.

APPENDIX G CHAIN-OF-CUSTODY RECORDS

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

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	_	1536	Mercury	/					
	./\	167, x 166	WON'THE	/				SPLIT	
	1	1.93	Oheno (/					
		191	Horb	/					
	\dashv	136	0+0	/					
		784	Pest	/					
	7	882	0+6	/				SPLIT	
<u>-</u>	1	28%	Pest	/		÷		SPUT	
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample	Sample Source	& Client USAF	PULUTH	IMP DULUTH MIN.	UTH MIN.	FIC	Field Personnel (Signature)	nature)	
Project Title	i '				Job No. 10/6- 267		the A. Madar		
Date	Time	Sample I.D. No.	Sample Type	No. of Containers	rs Sampling Site	te.	Remarks		
11/24	•	108 + 662	109/209	3/3	SW7A				
	.\	1554965	209/109	7/3	5W8A				
		817+319	209/109	3/3	SWBB				
52/11		305	Aest.	1	5w8B				
		212	046	1	SW8B				
11/25		1307	Pest.	1	SWEB		SPLIT .		
	, ·	309	Phenol		SW &B				
11/25		311	4668	_	SW&B				
		314	metals	1	5w8B				
		315	Metals	1	\$78MS		SPLIT		
1/25		322	Selivent	_	SW8B				
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Relinguished	lahed by:	r: Date, Time	Received by:	by: Date	Time Relinquished by: Date	Date Time	Received by:	Date T	Tine
The state of the s	of A Muchan	0E11 Med. 1			Rivate Cayner	3/1/2/12/18	\nearrow	1 Milkel	315
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

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mple So	Sample Source &	Client	USAF	DULU TH	TER D	ロンパンド	4 MW.		Field Personnel (Signature)	ignature)	
Project Title	tle						윽	T	Lot Meder	1	
Date Ti	Time	Sample I.D. No.	О.	Sample Type	No. of Containers	of ners	Sampling Site		Remarks	S)	
11/25/11	,	327		0+6	/		5W8A		SPLIT		
_		324		RST.)		SWSA				
		330		940	-		5w 8A				
-		323		PEST.	1		5w8A		SPLIT		
_	3	265		Herb.	1		5w8A				
	-	325		04-6	1		SWSA		SPLIT - SPK		
	1	678		Pheno/	/		28.84				
	1	486		Metals	,		SW8A				
		341		Edinas	1		SW 84				
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample	Sample Source & Client		15 RF	Ph II	St. 2 T	CAS	Field Personnel (Signature)	
rojec	Project Title	DAZZ	3	MA	,	Job No. 10/6-267	1 (WAS) TAMBY!	
Date	Time	Sample I.D. No.	9.0	Sample Type	No. of Containers		Remarks	
1/26	7	5445 B-845	245	42.0	_	3	1	
11 26	7	5WB-A#416	9114	11	١	B		
32	7	6W3-A50-65411	7-6-54	411 Soil	_	~	VOA 6165 8/4 12/12/2015	
17.	B3-1	B3-A0-15 # 349	346	11	_	\ \ \ \		こフ
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1,521	£3.4	B3 4 5045 +348	343	1	-	2	North Market	
1,5	. 153-18	153-18 0-1.5 Hyo	192	:		ć.		
125	8450	1454 6451 BKS	27	3	_			
الأدير	E318	E3 8 50 65 # 348	# 368	=	_	~		
Z'S	33.70	B3 C,0-15 440l	702	~	1	2		
125	83 C	B3 C, 2540 4408	25		-	Cr	1	
11/25	336	1330 50 65 MID	2410	1,		C~		
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample	Sample Source & Client 1/4 MF	Client	14.00	16	1	14,2	IRP			Field Personnel (Signature)	nature)	
Projec	Project Title T	かった	\$		1	l l		Job No. 1016-267	149	Uhry D Fall	amperes	
Date	Time	Sample I.D. No.	9 6	Sample Type	916	No. Conta	No. of Containers	Sampling Site	0	Remarks		
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1/2)	7	5, te 3, dawn # 422	4.00	122				3		即即城市	1.14	
1/21	5	7 2715	1mm# 42	121				7		6P Dx 1620- 126-11-1	5.71.75	
1/2	9	6w3-D 510-6.5 #426	157	71/2				8			-	T
722	9	Swt 4 10 10 115 16 427	2-11:5	424				7	3	Vol org (EPA 601, SW 8010)	N 8010),	
1/2/		1240 H 429	4.0 4	52h.				4		Arom Kes (6602, SAMBOZO)	(0200)	
7/1	7	H-4,5,0-6.	-6.51	432				4		Dis 4 (sve. 42)		T
7		944,75-90,18433	9.0.H	433				4				
1/21	9	84-6 25-40	40	436				4				T
12/2	1	5.11-St 6-42	7	436				5				$\neg \tau$
12/2]	15-8-14	5.0-6.5	443·1	>			4		7		\top
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818)	(Signature)	10/1/01	1730		gnaturi			Arwale Carre	13H13.11	M. A. A. Levison		္
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

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Project	st Title D.	1.77	1	6-	17	1-2		Job No.1 0/1-2	7)		11. Fellin	15:5	:
Date	Time	Sample I.D. No.	Θ.	Sample Type	0	No. of Containers	of iners	Sampling Site	te .		Remarks		
12/13	<i>.</i> .)	604-6 16	10.0-17,	Hyus.	- 			1,					
21 2	1/	-	5.3-6.5	15th #	_	-:		4				•	
2122	1	1 1	5.0-6	240				÷					
1212	9 - 	6-5-03 9-5-3		-5267				3	<u>ن</u> (ج	Œ.	There was st	1. 1. 1.	
5/2	, y –	64-4-5-65	2.5.4	1260				+-	(2C		, Δ. Υ. Ε. Ε. Υ. Α.). (10.1)	
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-11.11	159 -	4-4 75-40		437				7	ile o		Reare us.	tan	1:
1:32	17 -	Ca. 7-1 10 115 4428	12/1- 4	442,8				/~	(קני	, J	h. (4C	7:17	
2, 11	- 8	84-13 5.0	5,2 4.5	3440				7	41.	*		1	
7	- 3.	-5-6 21-1-2	1.5-4.0 4	-5647				7	(40		1001 6. 70)	<u> </u>	
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1	5 -	1, 831.2		22h#	*	٨		5	197				
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Project Title	D. Loth	3	2,7			300 No. 10/0 /	T	Contraction of the Contraction o	1
Date Time	Sample I.D. No.	9.3	Sample Type	No. of Containers	ars	Sampling Site		Remarks	
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12/4	134-654	50-65	B453	_		t			
11/2)	B4-c 75	340 CP 24	tyss			4			
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12,14		15-40 #447	thh#			4			
4.2.7		5.0-6.5	1 1 1			5			
12,14	13-C 7.2-43	1 .	#422			†		deylia te	
12/4	RT-C 5.0-65		h5h' #			4		Spite	
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12/3 Causan	15-4W4-6		A 8443	•		4		1BC	
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source	∞	Client ノスイド	AF Dill	(+1/1 ?	7.27		F	Field Personnel (Signature)	inature)	
Project Title	1	171	1			Job No. Jul	` + · ·	(. way) 22	1.7.6	
Date	Time	Sample I.D. No.	Sample Type	No. of Containers	of iners	Sampling Site	е	Remarks		
77.72	<i>y</i>	Sec. 8 -25	15 454 61	-		ر ج	Ü	CP 756 11. 126.	, , ,	
	×	500 153	4 46.2			4	7	17 RV 1 156	(i.i.)	
	× 13.	175-40	0,4466			٥.		,	`	
	* D	1-0 k-	3 464			J)				
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Sample Source	⊲	Client	T.10 3	Ť	7 3	071			Fleid Personnal (Si	(Signature)	
Project Title		7 .		13	\ \ \		Job No. 1016-267			nunhay	
Date Time		Sample I.D. No.	Sample Type		No. of Containers	ors.	Sampling Site	61	Remarks	S	
1/2 1	× 63-8	68-8 2540 #4x	\	- &	١		పు				
19/10	x 6%-8	X BY-B, 0-15 #473	473		-		υÇ				
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기기	×68-6	×69-6,50-65,	14.73				x		→ 0, K. €		
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Project Title Date Time Sample Type Containers Sam Sample Type Containers Sam Sample Type Containers Sam Her 487 WATER I GWI GWI AFT 487 WATER I GWI GWI AFT 487 WATER I GWI GWI AFT 497 WATER I GWI GWI AFT 497 WATER I GWI SWI SCI WATER SCI WATER SCI WATER SCI WATER SCI SIgnature) Relinquished by: Date Time Received by: Date Time Relinquish (Signature) (Signature) Relinquished by: Date Time Received by: Date Time Relinquish (Signature) (Signature)	STR 2 TRP DAILYTH TAP MAI	lature)
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1-3pm 487 WATER 1 449 489 WATER 1 449 499 WATER 1 441 491 WATER 1 441 491 WATER 1 441 491 WATER 1 441 491 WATER 3 1-3m 501 WATER 1 18hed by: Date Time (Signature) 18hed by: Date Time (Signature) 18hed by: Date Time (Signature)	No. of Containers	
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Project Title Sample Sample Containers Sampling Site Sample Containers Sampling Site Sample Containers Sampling Site Sample Sample Containers Sampling Site Sample Sample Sample Sampling Site Harden Sampling Site Harden Sample Sampling Site Harden Sample S	Sample Source 8	& Client USAF PHA STED	1 .	IRP DULUTH IAP	MN.	Field Personnel (Signature)
Time Sample Sample No. of Type Containers 1-3pm 503 WARE	Project Title				Job No.	Holm A. Media
1.3pm 503 WATER	}	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
507 WATER 510 WATER 511 WATER 513 WATER 514 WATER 517 WATER 517 WATER 518 WATER 1-5pu 520 WATER 1-5pu 521 WATER 1 S21 WATER 1 S22 WATER 1 S22 WATER 1 S22 WATER 1 S23 WATER 1 S24 WATER 1 S22 WATER 1 S23 WATER 1 S22 WATER 1 S23 WATER 523 WATER 523 WATER 523 WATER 523 WATER 523 WATER 524 WATER 523 WATER 523 WATER 524 WATER 524 WATER 523 WATER 524 WATER 528 WATER 53 54 55 64 65 65 65 65 65 65 65	13/186 1.3pm	503	WATER		5W1C	PHEXICS
507 WATER	*	505	WATER	-	6w]c.	HERB.
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Sample Source	& Chent 1/47	2代 小田 休之	2 丁町		Field Personnel (Sygnature)
Project Title	Delett	117		JOD NO. 1616-267	//
Date Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Scaen Almarks Remarks
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73:12	42-175		,	15/15-	PAENEL
13:09	(Ui-C #527			5.75-1	MERUNEY
	611.0,#SE		/	1-21/5:	On Electoria
13:00	13:00 GWI +D, #529			Sire	FEDG Merry Dynamic
13:07	CES#10-1175		/	12/15/	On stower Las Cil
13:18	18540-105		_	\5.7e-/	HETBICAN
BE: 87	CL1-0,#532			1512	Person
	CWI-D, # ST3		/	15,75/	Freshor LAB COC.
	41.07539			15,12	PASTAGE LABBOY
_	CUI-0, #535		W	15,75	602 313miss
	6411-17.26		£.	Sire 1	601 Cas GO 305.715
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source	& Client //K//E	777	Pures Sines	Jal Ca				Field Personpel	- ا	(Şignature)	
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Date Time	Sample I.D. No.		ادەما	No. of Containers			c)	STEVEN	Remarks	4	
11:11 14:4/2	CLUE #54	Ŋ	Lares	\		Sire 1		Heaver	XX		
11125	(WIE # SA)	5				- Sire-1		HEPBICIDE	100	·	
01:10	(U) = #548	20		-		Site		Meny	×		
11:19	(W-E#549	49				5,705/		PHENCL	ופל		
	W.E. #550	R		,	_	5,15/		H-an	Homes Frein C	" Danax	7474
7:25	SUIE #551	75		1		SnE-/		Pesicipe	De		
6/://	GUI-E#582	☆		/		1 -51 S		HETAS	5 Frema	C Barase	CANC
72:11	CUIE #553	5.3		/		Sire 1		On Mark	PL-ASE	- 1	
11:28	WIE"559	20		/		5150 l		PHENER	C	TRICATE	
	SUIE#555	22		/		1-215		Du 20	2450	1×8 GC	
10:04	4)1E *556	25		~		Sure!		109	_ 1	3 Ames	
70:11	4115 #557	57	/	Υ,		Sirel		100	٦,	3Bornes	-
	411-E#558	86		Ε,		Sire 1		602	75	Komes	
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

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Sample Source	& Cilent	1 分件	F M. C.	Str2 74	J		Field Por	Personnol (Signature)	ature)	
Project Title	गुन्य		12. KM	,	Job No.			A Min Bo		
Date Time	Sample I.D. No.	• ·	Sample Type	No. of Containers		Sampling Site		Remarks		
±101 9)/21	6155 BASH	576	420			12	17.104/	'	1	T
12/16 100 F	645B #5P	572					A. T.	artin corri		
0101 11/21	64544573	73		_			0			
,	2454 4510	360					1000			
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13/11 1003	Brush # 570	170		-			13.0 15.7	500		\top
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3169 SIL	725g y5m9	179	7	~	5		1001	7/1/67		$\overline{}$
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample	Sample Source & Client	1	55	OL D	142 1	17		Fie	Fieldy Personnel (Signature)	nature)
Project Title	1	truth	£ ₹	MN			Job No.	7	Un VAII	120,000
Date	Time	Sample I.D. No.		Sample Type	No. of Containers	9rs	Sampling Site	-	/ Remarks	
12/16	1531	GUST-C#585	35,	0 4	_		7		970	
-	1518	(win- 2.4 57.6)	78	2	_		_		Post dies. he	Jac
	1523	125c 4	4.27		-				Photol	
		3554,25W	38						Port	
	1526	1985 A 72-18	32		_				herbicite	
	1516	Gwic # 590	90					1	he tah	
	1502	Bu-10 4 591	11					-	ליפונניין	
	1815	6W5C, #592	7)			14	144 x 4-1, 1 fell (de	Carities was
-	125 /1	8254, 2:19	1.3		10			9	602 (12 60#ts	
	19541	Bros 40504	14!	•	7		Č	9	601 (3 60/HEL)	
//	1454	61-5 # 9412	5	A	37			603	2-(3 bottes)	6210 GC,
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Relinquished	uished by:	Date	Time	Received by:	by: Date	Time	Relinguished by: D	Date Time	Received by:	Date Time
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Samp	le Source	Sample Source & Client USAF	187	F PHI	515, 2 1	da7			Field Pe	Fleld Personnel (S)	Signature)	
Proje	Project Title	Zurer	77	P MA	,	Job No.	٥٠.		W	X) (/	
Date	Time	Sample I.D. No.	О.	Sample Type	No. of Containers		Sampling Site	Θ	Siai	Formark	SACE	
12/26	13:19	110#A-FUZ	#e//	Warez	/	V:	5,76 7		Prema	9		
1	/3,/3	4-4# LOS	6007		7		1		0	\$ Corner	1	
1	13:16	GW7-4#610	460		/				0,0	S Cocke		- Verent
1	13:10	5U7-A-FUB	600		/				HEERICAN >	> **		
1	13:20	F0777-Em	€07	<u> </u>	/		×		Personer	7 72		
	1	CUZ-1 *106	100	_	/	S	5.75 7		D	Arra Trok	1	
+	11:17	115-1 # 635	f635		/	5/75	7¢ S		0, 8 (0.45)	JAN TO THE PARTY OF THE PARTY O	200	
1	13:14	CU7-1# 609	600		,	5175	ر. د. ۲		Horne	V		
	2/:5/	207# 1. FW	507,	7	/		\		Hermore	70		
	(3:03	CW7-1,#64	147;		Υ				2	}		
*	//; 8/	647-44613	613	4	Μ		3		10%			
14/4	12.55	15:55 CW7-X#C12		Waree	Μ	5.75	7 7		23	Spires		
Relinq (Sign	Relinquished by:	Date	Time	Received by:	Date	Time Relinqu	by:	Date Ti	Time Rec	Received by:	Date	Time
M		Aug .	17:30	(airellarine)		and the state of t	L L	7/10/8/10/14	_>	(Signature)	Jalo!	700
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample	Sample Source	& Client USAF	Pull	5,4. 2 IRP		Field Personnel (Signature)	
Projec	Project Title	Ducory D	a)	Job No.	5-34%	
Date	Time		Sample Type	No. of Containers	Sampling Site	Srace J. Hynet. Romarks	
17/2/4	15:01	CUS-1#640	WATER	/	Sne	Frence LAB QC	
į	11:06	115-A* 4.86		,		PHENOL LABOR	
	11:13	CUS-A# 634				£3X	
	≯ \$:0/	KL15-A, #639		7		Dynans	SE SE
	11:09	CUS- A #641		/		,	
	11:05	6W5-4#642		,		Perrapes Panan Da	3.
	11:39	615.1 #632		_		Freshors	
	10:52	CUS-1, # 633		\		HEROULY	
	10:54	605 1 # 620		/		Merres	
→	10:36		1	3	2	(3 Borness)	
18/4/21	10:36	545-2005	WATER	٨	575.5	601 (380mas	
19,7/2	12:0	B7#1505		4	5,000	FIETE CR. PASE BLANK LEY	
						- }	
Relinquished		by; Date Time		: Date Time	Re	Time Received by: Date	Time
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD (20,0) (7, 50,0)

(Field Personnel (Signature)			Remarks	602 hald GC, dupo	602 Spite	82	109	ti plant	601	709	Pesticies Trip Blank	`	Perticides	Netals	Herbicides Lass Co	Meximy	lestrile 14600	Metals Holder duy	Time Received by: Date Time	(Signature)	130 100 Juin 130	Time Received by: Date Time	(Signature)	Time Received by: Date Time (Signature)	
000000000000000000000000000000000000000	-U/C // 11 11 11 11 11 11 11 11 11 11 11 11	Job 110. (016-26 F	Sampling Site	1		4	7		4	4			7	7	7	7	7	7	Relinquished by: Date	(Signature)	Private Carrier 11/16	Relinquished by: Date	(Signature)	Relinquished by: Date (Signature)	
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	၁ 1	Project Tille Duch	Dute Time San 1.D.	12/18 10,0 GW76 4652	12/18/1010 Guttitle 653		0454 1601 1001 1011111	PFER APUND	17/18/1010 Gar76, 8255	12/18/1010 RW76 4659	1005 GW11SF669		4/18 1043 GWIB#664	Yr 1029 GW78 4663	12/18 1049 GW 78#660	418 1026 GW18#663	ł	1418 1049 GW18#661	Relinquished by: Date	(Signature) (2/	an Blokall "	Relinquished by: Date	(Signature)	Relinquished by: Date (Signature)	

Sample Source &		Client USAF	PhI	Sta I	IRP	Fie	Field Personnel (Signature)	lure)
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Date Time	Sample I.D. No.	iple No.	Sample Type	No. of Containers	Sampling Site		Remarks	
ES01 8/c1-	92448 WP	34656	HaO		7	W.	enol 646 QP	
	1	#659	11		7	D.	"Grease	46 QC
14/8 1607		#173	77		7	0	O:1 " Grass	
-Wx 1033		1497	=	/	7	#	Herbicides	
-		L #72	U)	7	17.7	1 5/Greage d	46
		3 4066	<i>))</i>)	7	0	1 1. Sycare	0
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-17/8 Jug3	_	599	"	7	1	R	land	
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Ļ	· .`	1. A.B. # 28L	78%		,		4		3 310	بمديمي		
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		1.85 # 26.7	25.2		\		>		9	Gorde Las a		
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		ole 10.	1804	808	# AX	\$ 35	# 803	708+	#614	#312	610	170	813	#302				Time		Tine		Time	
Client	2 WAY	Sample I.D. No.	0800 cute #804	808 # 8mm	×3.C	MW-10, 4927	KUTC #803	1200 # 306	35	7	Hald #810	PIWIO # 0'1	MWR # 813	1	<u> </u>			Date	The state of	Date	· · · · · ·	Date	
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source	∞	Client USAF	N	F Patt	SXN	TEP	Fie	Field Personnel (Sig	(Signature)	
Project Title	15	24074	TAR	12		Joh No. 1016.	7			
Date Time	 	1 4		Sample Type	No. of Containers	Sampling Site	ຄ	See en J. Remarks	Krikt	
120/2 15:	So Mu	15:50 MUIL# 825	2	Wared	3	4	709	1 (SKS) nes		
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V	12	HINT FRZ		→	~	>	100)	1/3Bones /	TI BEN	E.
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CHAIN-OF-CUSTODY RECORD	
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JRD	Field Pergennel (Signature)	C James	Remarks	046	016 Cel QC	Photoric	Outs Late OC	046	Dies 0)	Out, Field ac dup	Hero	246	100 /m/ OS	601 (ak GC	60	Bir	209	Time Received by: Date Time		Time Received by: Date Time (Signature)	Time Received by: Date Time (Signature)	
& MOURE CHAIN-OF-CUSTODY RECORD	ره	Job No. 1016-267	Sampling Site	7	7	4	٨		2	7	2		C	7	7	7	7	 3	(Signature) (5/m)	·	Relinquished by: Date (Signature)	
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2	& Client 1/5	Duluta	Sample I.D. No.	6W2-CAB3	6W2-0#873	Gwzd #BA	CW2B #84B	KHOZY "FEING)	-	GW28 1880	GW28 #854	184 02mg	1.00 L C		1 ~	GW20 #88	GN-28 #83	Date Time	\\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Date Time	Date Time	
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7		[~	£633	И		2	Phers
1)-	1157		4202	1,	8	7	601
<u> </u>	1348	JAWY,	4016)1	<i>C</i>	7	602 Field ac dup
7/1	_	# \ \M\\	870/4	11	3	7	601
7		1 W. A	4054	i i	h	7	209
7/2	-	MW5, #	#50°C	## ##	3	2	602 Fold GC, dw
1/4	7207	MWS, 1	the)1	2	7	602
h / 1	9291	blu6, 4	4435),	γ	λ	60/
1/4	6(4	More, 1	7634	11	3,	7	709
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

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Saniple Source			17			Job No. 1016 ->6>	V)			
Project title 7	フェクライ	147	- 1 -			3		Sam Hay	1	
Date Time	Sample I.D. No.		Type	No. of Containers	ñ	Sampling Site		Remarks	\	
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

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Project T	Tille D.	Drus IA	Z		Job No. 1016-267	
Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Srever J. Hynet Remarks
1667 13	1330 6	CW38 #994	WATER	/	#3	PHENOL
5/7	133/ 6	CW36 #PED	1			/YETALS
<u> </u>	1333 6	766#BEM		7		Thosa Las Oc
-	330 6	GW384099		/		Hemse.
// //	131 6	GU30 #881		_ /.		Percipe LIBA
+ / ~	203	268*0E75				Heaver
-	D 4250	876#YEMD		/		Presess
	7 -	W34#926		/		MERCAY TROBLANK
·// /	130 6	GU3C #980	/	/		10, E George (4300
16/10	DS1 C	GU3C#986	Waree	/	#3	HONES
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

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Project	act Title	C	TAD	X	1		Job No. 1016-267	52				T
Date	Time	Sample I.D. No.		Sample Type	No. of Containers	rs -	Sampling Site	6	Й И	Srever Homarks	Ř	F
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4	1055	543C#884	\$						Puero	*	-	T
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sampl	Sample Source	& Client 265	USAF PAD	7 235	PD	Field Personnel (Signature)
Project	t Title	Dunt	J. J.		Job No. 1016-267	Say
Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampilng Site	Share A Hower
1663	0350	GUNT 792	WARE	/	M	Hermones Las OC
	J	C4134#869		`		HEBRODES TROPIENK
	1130	75cm	/ /			Herus
	₹130	GU34#920		\		Percipes
+		229* 45(4)	/	,		HERRY
	480	EE6# 1275				HEBRIDES LAS CH
+	6807	G13C#982				Pesropess
	1327	565# 85m2	>			Preside Lats OC
	8501	836 # JEMS	3	. m		(cy CA OC (3Bornes)
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

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Project Title	Document	TAP	7.7	-		Job No. 10/6-267	7			T
Date Time	Sample I.D. No.	_	Sample Type	No. of Containers	υ	Sampling Site		Remarks		
1/262 1100	GLISD * MAS	*	Wared	,		#3		PHENOL		
	Q130# 437	32+	-4/4				1	HERUS TEXPORANI	Mr.	T
ASS	C430*10	1040					+	Pesicipes		
5601	Q4330#035	35+						HETUS		
287	CLI30# 104/	10						HEZBKIDES		
,	DED/# DEUZ	2						HETHS TRYBEANK	Z.K.	
1103	SUBD [#] CEUS	12						Ou FLAENSE		
888	8ED/#0EM2	88						Needy		
p25/	MUZ#NOAS	-54						Or & Greatse		
883	OSON # FULL	8						- 1	-	-
2637	HUX* DAG	*		Α.			3	601 LAGO (3Bornes	7253	
8280	+	426		(A) €		1 Broken	3	601 (3Borness)		
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

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Project Title	Title 🗸	Durn	INP.	1	.		Job No. 1016-267	267	<i>ا</i> لا 1			
ate	Time	Sample I.D. No.	ole Vo.	Sample Type	No. of Containers	f ors	Sampling Site	te	-	Shared Howerks	HYNE	N
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1	(05)	12834	423		/				7	More Discovery	F. F.	200
	1323	CLBB*	Š		/				0			
	1323	4.88 #	520	_	/				1	Kenso		
(S)	1320	C4.88 *	\$		/				×	Herminister		
63	305	C1.88 *0	28		/				1	Notice Day Of	1	2000
5	(308)	GLIBB #1030	230		/				103	No.		
/3	13/3 6	CLEB#1027	422		/				1	Money		
	1304	C4785*	K E E E E E E E E E E		,				0	7-04-2	Ja Care	No. of
27	9 0821	CLEGE A	ADSS-		M				100			
	2 257	5126*1029	24		m				9	601 (380mex)		
000/ 19/6/		GUBB# OX	સ્	Who	E		#		3	7 /1	1 10 m	10000
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No.	<u>)</u>	10%) \		 .	rivate Carrier	1 18/2/	1505	100 / mm	2	1565
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Title	Sample Source &	Client 1/2/	ヘンルグ・	dat o		(Field Personnel (Signature)
Sample Type Containor Containor Type	Title		7 2	1	Job No. 10/6-267	
1543	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	States Hemarks
1258 CLIPATE	42 1543	1.80 # DEB	VATER	/	#8	Frem For D. D. D.
-	/388	104 × 1062	\			Herover
1237 1280 # 126		1.18/#1085		\		Bery TROBUNE
-		1380#1261		\		
419 2181#091 2181#089 /550 2180#085 /550 2180#085 /550 2180#085 /550 2180#085 /550 2180#085 /67 / 80 / 80 / 80 / 80 / 80 / 80 / 80 / 8		1131# XBL				PHENDE TRY KANK
1915 CUEATHORY 1915 CUEATHORY 1530 CUEATHORY 1530 CUEATHORY 11		184#187				Herus
1915 CUERTINGS 1530 CUERTINGS 1527 CUERTINGS 1527 CUERTINGS 1119418hed by: Date Time Received by: Date (Signature) 1119418hed by: Date Time Received by: Date (Signature) 1119418hed by: Date Time Received by: Date (Signature) 1119418hed by: Date Time Received by: Date	1	1.54 #1089		\		HEBSCIES TRIPKANK
1530 CUBC #65 3 1530 CUBC #659 1530 CUBC #659 167 Inquished by: Date Time Received by: Date Time Received by: Date Time Received by: Date (Signature) 1580 Signature) 1500 Signature) 1500 Signature) 1500 Signature) 1500 Signature) 1500 Signature)		080 M. D.SO		\		Verner
67 530 CUBOPPOS 3 67 530 CUBOPPOS 4466 3 11 nquished by: Date Time Received by: Date Time Received by: Date Time Received by: Date Time Received by: Date (Signature) (487) 11 nquished by: Date Time Received by: Date (Signature)	(53)	1180 # 269		\		HERBOIDE CLO CX
11 SZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ	Τ	CSON WORL		€		W Flado Chy (38m
11 Inquished by: Date Time Received by: Date (Signature) 11 Inquished by: Date Time Received by: Date (Signature) 12 Inquished by: Date Time Received by: Date (Signature) 13 Inquished by: Date Time Received by: Date	T	1,40 HOSB	_	4)	\ \ 	(CC (3 Conics)
by: Date Time Received by: Date (Signature) by: Date Time Received by: Date) (Signature) by: Date Time Received by: Date	1530	WORKES	where	1	8#	(0) (3.Bimes)
by: Date Time Received by: Date (Signature) by: Date Time Received by: Date (Signature) Note Time Received by: Date						
by: Date Time Received by: Date (Signature) by: Date Time Received by: Date (Signature) by: Date Time Received by: Date						
by: Date Time Received by: Date (Signature) by: Date Time Received by: Date (Signature) (Signature) by: Date Time Received by: Date						
Date Time Received by: Date Date Time Received by: Date	1 7	_	Received	: Date	Time Relinquished by: Date	Time Received by: Date Lime
Date Time Received by: Date Date Time Received by: Date	Signature	14	Sign)	first (avie 1/1/17)	1132 (aus 14/17)
hy: Date Time Received by: Date	Unquished by: (Signature)	Date	Recel (S1gn	: Date	Time Relinquished by: Date (Signature)	Time Received by: Date Time (Signature)
(Signature)	Relinquished by: (Signature)	Date Time	Received by: (Signature)	Date Time	Relinquished by: Date (Signature)	Time Received by: Date Time (Signature)

G-49

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source &	Client	K	1X1E QT <>>	TPP		Fiel	Field Personnel (Signature)	ure)
1 1	Joseph P	4	3		Job No. 1016-267	\ \ \ \		
Date Time	Sample 1.D. No.	9 6	1	No. of Containers	Sampling Site		Snew J. Howest Romarks	
2 - Calar	508C # 10%	2%0	Warek	/	9 /	12	PHONOL FLED OCK BASE	SE BANK
1	480 # 0875	204		/		1/2	General France Posts	Se Bank
7 - 1	SUBJET 1085	\$80)	\		0	Duillow France Porse	Les Car
N SW	080 pt 78185	080		\		03	Diezos	
Ž	SUBC #OLS	365		,		03	Heras	
75 8887	2901#2817	290	/	\		CA	PRONSFIELD C	Za.
	500 # DEC	99%	/			Ď	dans	
	SCH # YELL	820	Unree	/	B A	Ga	Soucios	
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- :	11-		To a Constitution of the C	D. P.O. 171mo	Time Delinentshed by: Date	Time	Received by: D	Date Time
(Signature)		A.K	(Signature)		5		re)	
レ ※ 山 が	40%		M. Almadon	5,016.8/1	6.	18161	9x1/m	
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Relinquished by: (Signature)	Date	Tine	Received by: (Signature)	Date Time	Time Relinquished by: Date (Signature)	е Тіпе	Received by: Da (Signature)	Date Time
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DAMES & MOORE CHAIN-OF-CUSTODY RECORD

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No. of Containers	
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Date Time Relinquished by: (Signature)	Date
Date Time	

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Samule Source	& Client	7.	O.T.	745	IRP	Field Personnel (Signature)
	7/1.7	-	1		Joh No. (616-267	Uny Frinos
Date Time	Sample I.D. No.	0 0	Samplo Typo	No. of Containers	Sampling Site	Remarks
113 1156	# 1001 7	٠	th O	2	8	37.05 70 97
1200	\$10 28) = 	2	00	602 Cab 60 spit (the first
\Box	B 1099		7,		8	phenol Field ac Britain
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					-	
		<u> </u>				
Relinquished by:	: Date	Time	Received by:	Date	Time Relinquished by: Date	Time Received by: Date Time
(S) gnature)	1/13/	027	(Signargre)		Private Carrier 1/14/97	13/2/
Relinquished by: (Signature)	Date	Tine	Received by: (Signature)	Date	Time Relinquished by: Date (Signature)	Time Received by: Date Time (Signature)
						Time Becelved by: Date Time
Relinquished by: (Signature)	r: Date	Time	Kecelved by: (Signature)	Date	ilme Kelinquished by: Date (Signature)	(Signature)

APPENDIX H
ANALYTICAL REPORTS

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

					B1-A	B1-A	B1-A	GW1-A	GW1-B	GW1-E			82-8
			Detection	Field #:	0-1.5	2.54	5-6.5	10-11.5	5-6.5	20-21.5	SS-1A	SS-1B	0-1-5
Parameter	We thod	Un ts	Limit	Site :	ONE	ONE	ONE	ONE	SNE EN	ONE	ONE	ONE	TWO
Purgeable Halocarbons	EPA 8010 (9)	6/6n	MDL (2)										
Bromodichioromethane	EPA 8010 (9)	6/6n	0,0018		9	9	9	9	2	2	2	¥	2
Bromoform	EPA 8010 (9)	6/6n	0,0022		9	2	2	2	2	2	2	2	QN
Bromonethane	EPA 8010 (9)	6/6n	0,0032		2	Q	9	Q	9	2	2	9	9
Carbon Tetrachloride	EPA 8010 (9)	6/6n	0,0023		2	2	9	2	2	2	2	2	QN
Chlorobenzene	EPA 8010 (9)	6/6n	0,0018		9	2	2	Q	ş	2	9	2	9
Chloroethane	EPA 8010 (9)	6/6n	0,0019		2	2	2	2	9	2	2	2	Q
2-Chloroethylvinyl Ether	EPA 8010 (9)	6/6n	0,0022		⊋	9	9	9	9	2	9	2	9
Chloroform	EPA 8010 (9)	6/6n	0,0022		2	2	9	2	2	2	2	2	QN
Chloromethane	EPA 8010 (9)	6/6n	0,0024		₹	9	9	2	9	2	9	9	2
Dibromochloromethane	EPA 8010 (9)	6/6n	0,0016		9	9	9	2	9	9	2	9	2
1,2-Dichlorobenzene	EPA 8010 (9)	6/6n	0.0014		9	2	₽	2	2	2	9	2	2
1,3-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0021		2	2	9	2	2	2	2	2	QN
1,4-Dichlorobenzene	EPA 8010 (9)	6/60	0,0020		2	9	₽	9	2	9	2	9	9
Dichlorodifiuoromethane	EPA 8010 (9)	6/6n	0,0016		2	2	2	2	2	2	2	2	Q
1,1-Dichloroethane	EPA 8010 (9)	6/6n	0,0025		Q	9	9	2	9	2	2	2	2
1,2-Dichloroethane	EPA 8010 (9)	6/6n	0,0022		9	2	2	9	2	2	2	2	Q
1,1-Dichioroethene	EPA 8010 (9)	6/6n	0,0025		9	9	₹	2	2	2	2	2	2
trans-1,2-Dichloroethene	EPA 8010 (9)	6/6n	0,0021		9	2	2	2	9	2	2	9	Q
1,2-Dichloropropane	EPA 8010 (9)	6/6n	0,0010		9	9	2	Q	9	9	9	2	S
cis-1,3-Dichloropropene	EPA 8010 (9)	6/6n	(1) 8000 0		9	Ş	Ş	Ş	Ş	5	Ş	Ş	Ş
trans-1,3-Dichloropropene	EPA 8010 (9)	6/6n	0.000		2	₽	2	€	?	2)	2	}
Methylene Chloride	EPA 8010 (9)	6/60	0.0017		9	2	Ð	2	2	2	2	2	윷
1,1,2,2-Tetrachioroethane	EPA 8010 (9)	6/6n	0,0019		2	9	2	2	2	2	2	2	QN
Tetrachloroethene	EPA 8010 (9)	6/6n	0,0019		2	9	9	ᄝ	2	2	9	2	2
1,1,1-Tr ichloroethane	EPA 8010 (9)	6/6n	0,0026		2	2	2	2	2	2	2	9	Q
1,1,2-Trichloroethane	EPA 8010 (9)	6/6n	0,0026		9	9	9	9	9	2	2	9	웆
Trichloroethene (TCE)	EPA 8010 (9)	6/6n	0,0030		2	2	9	2	2	2	2	2	Q
Trichlorofluoromethane	EPA 8010 (9)	6/6n	0,0022		2	g	2	9	2	2	9	2	2
Vinyl Chloride	EPA 8010 (9)	6/6n	0,0027		9	9	2	9	2	2	9	2	Q
	•	•											

Reviewed and Approved by John D. Langler,

DATACHEM ANALYTICAL REPORT Duluth 1AP - Soil Samples

				Field #:	82-8	82-8 5-6-5	82-C	82-C	82-c 5-6.5	GW2-A	GW2-8 5-6-5	GW2-C	GW2-D
Parameter	Method	Units	+	Site :	Two	T#0	240	TWO	OM	J.	OWL OWL	OM.	TWO
Purgeable Halocarbons	EPA 8010 (9)	6/6n	MDL (2)										
Bromodich loromethane	EPA 8010 (9)	6/6n	0,0018		9	2	오	Ş	2	Z	2	9	2
Bromo form	EPA 8010 (9)	6/6n	0,0022		2	2	2	2	9	9	9	9	QN
Bromomethane	EPA 8010 (9)	6/6n	0,0032		2	Q	9	9	9	2	9	9	9
Carbon Tetrachloride	EPA 8010 (9)	6/6n	0,0023		9	2	2	2	2	9	9	9	Q
Ch l or obenzene	EPA 8010 (9)	6/6n	0,0018		9	9	9	욧	9	2	9	g	9
Chloroethane	EPA 8010 (9)	6/6n	0,0019		9	2	2	2	9	9	9	2	QN
2-Chloroethylviny! Ether	EPA 8010 (9)	6/6n	0,0022		9	2	읒	2	9	2	2	Ð	9
Chloroform	EPA 8010 (9)	6/6n	0,0022		2	2	2	2	9	2	2	2	Q.
Chloramethane	EPA 8010 (9)	6/6n	0.0024		Ð	9	9	Ş	2	9	2	2	9
Dibromochloromethane	EPA 8010 (9)	6/6n	0,0016		2	9	2	9	2	2	9	9	QN
1,2-Dichlorobenzene	EPA 8010 (9)	g/gu	0,0014		9	9	2	용	2	2	9	9	Ş
1,3-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0021		9	2	9	2	9	2	9	2	Q
1,4-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0020		9	9	9	2	Ð	9	9	2	2
Dichlorodifluoromethane	EPA 8010 (9)	6/6n	0.0016		9	9	2	9	2	9	9	2	Q
1,1-Dichloroethane	EPA 8010 (9)	6/6n	0,0025		9	₽	2	욮	9	2	웆	9	9
1,2-Dichloroethane	EPA 8010 (9)	6/6n	0.0022		9	2	2	₽	2	9	2	2	9
1,1-Dichtoroethene	EPA 8010 (9)	6/60	0.0025		9	9	9	2	9	⊋	2	Ş	2
trans-1,2-Dichloroethene	EPA 8010 (9)	6/6n	0,0021		2	9	9	9	₹	S	2	9	Q
1,2-Dichloropropane	EPA 3010 (9)	6/60	0,0010		2	Q	윷	₽	2	9	2	ð	9
cis-1,3-Dichloropropene	8010	6/6n	0.0048 (3)		9	9	9	2	9	9	9	£	2
trans-1,3-Dichloropropene	8010	6/6n)	!	ļ	!	!	•	!	!	
Methylene Chloride	EPA 8010 (9)	6/6n	0.0017		9	S	Ş	9	£	2	2	2	9
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	6/60	0.0019		2	9	2	2	2	2	2	9	QN
Tetrach! or oethene	EPA 8010 (9)	6/6n	0.0019		2	2	2	2	2	9	2	9	9
1,1,1-Trichloroethane	EPA 8010 (9)	6/60	0.0026		2	9	9	2	2	9	2	2	Q
1,1,2-Trichloroethane	EPA 8010 (9)	6/6n	0.0026		2	Ş	2	Ş	9	9	2	2	2
Trichloroethene (TCE)	EPA 8010 (9)	6/6n	0,0030		2	2	2	2	9	9	2	9	S
Trichiorofiuoromethane	EPA 8010 (9)	6/bn	0,0022		2	9	2	2	2	9	£	2	9
Vinyi Chioride	EPA 8010 (9)	6/6n	0.0027		2	9	2	9	2	2	2	2	Q

DATACHBA ANALYTICAL REPORT Duluth IAP - Soil Samples

					GWO - F				83-A	A-1-A	R3-A	A-7-B	R. P.
				Field #:	15-16.5	SS-2A	SS-2B	SS-2C	0-1.5	2.54	5.6.5	0-1-5	2.5-4
Parameter	Method	Un I ts	Limit	Site :	UMO	OMT.	TWO	OMI	THREE	THREE	THREE	THREE	THREE
Purgeable Halocarbons	EPA 8010 (9)	6/6n	MDL (2)										
Branodichi orane thane	EPA 8010 (9)	g/gu	0,0018		2	ş	£	2	2	2	2	9	2
Bromoform	EPA 8010 (9)	6/6n	0,0022		2	9	2	9	9	2	9	2	Q
Brancethane	EPA 8010 (9)	6/6n	0,0032		2	9	윤	2	2	2	2	9	2
Carbon Tetrachloride	EPA 8010 (9)	6/6 n	0,0023		2	2	9	9	2	9	9	9	Q
Chlorobenzene	EPA 8010 (9)	6/6n	0,0018		2	2	9	9	9	9	9	욧	2
Chloroethane	EPA 8010 (9)	6/6n	0,0019		2	9	9	9	9	9	2	2	Q
2-Chloroethylvinyl Ether	EPA 8010 (9)	6/6n	0,0022		₽	2	2	⊋	2	9	9	9	9
Chloroform	EPA 8010 (9)	6/6n	0,0022		2	9	2	2	2	9	2	2	QN
Chloromethane	EPA 8010 (9)	6/6n	0,0024		ð	2	9	9	욮	윷	윷	2	2
Dibromochloromethane	EPA 8010 (9)	6/6n	0,0016		9	2	9	9	2	9	9	2	Q
1,2-Dichlorobenzene	EPA 8010 (9)	6/60	0,0014		2	9	2	9	9	2	2	9	2
1,3-Dichlorobenzene	EPA 8010 (9)	6/60	0,0021		9	2	2	9	2	9	9	9	Q
1,4-Dichlorobenzene	EPA 8010 (9)	6/bn	0,0020		Q	9	2	2	윷	2	2	2	2
Dichlorodifluoromethane	EPA 8010 (9)	6/6n	0,0016		9	2	2	9	Ð	2	9	2	Q
1,1-Dichloroethane	EPA 8010 (9)	6/6n	0,0025		9	2	¥	9	2	9	2	2	2
1,2-Dichloroethane	EPA 8010 (9)	6/6n	0,0022		9	2	9	2	Q	2	2	2	9
1,1-Dichloroethene	EPA 8010 (9)	6/6n	0,0025		9	Ð	9	9	2	9	2	2	2
trans-1,2-Dichloroethene	EPA 8010 (9)	6/6n	0,0021		9	2	9	9	2	9	2	2	Q
1,2-Dichloropropane	EPA 8010 (9)	6/6n	0,0010		9	9	9	9	2	9	ð	2	2
cis-1,3-Dichloropropene	EPA 8010 (9)	g√gn	0.0048 (3)		Ş	9	£	9	2	9	2	2	2
trans-1,3-Dichloropropene	EPA 8010 (9)	βγβn	•		}))	!	!	!	ļ		
Methylene Chloride	EPA 8010 (9)	6/6n	0.0017		Q	ᄝ	2	2	2	9	2	2	9
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	6/6n	0,0019		9	9	2	2	2	2	2	2	Q
Tetrachi oroethene	EPA 8010 (9)	6/6n	0,0019		9	9	g	Ð	Q	Ð	2	5	2
1,1,1-Trichloroethane	EPA 8010 (9)	6/6n	0,0026		9	2	2	2	2	0.017	0,083	2	2
1,1,2-Trichloroethane	EPA 8010 (9)	6/bn	0,0026		9	9	2	2	Q	2	2	윷	₹
Trichloroethene (TCE)	EPA 8010 (9)	6/6n	0,0030		9	2	9	9	2	2	2	2	2
Trichlorofluoromethane	EPA 8010 (9)	6/6n	0,0022		9	2	9	2	2	9	2	2	9
Vinyl Chloride	EPA 8010 (9)	6/6n	0,0027		2	9	2	2	9	2	9	2	Q

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

					83-8	B3- C	B ³−C	83-C	B3-C	GW3-A	GW3-B	GW3-D	
				Field #:	5-6.5	0-1-5	2.5-4	5-6.5	5-6.5	5-6.5	5-6.5	5-6.5	SS-3A
Parameter	Me thod	Un i ts	Limit	Site :	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE
Purgeable Halocarbons	EPA 8010 (9)	6/6n	MDL (2)										
Bramodichloramethane	EPA 8010 (9)	6/6n	0,0018		2	2	9	9	9	9	9	2	9
Bromoform	EPA 8010 (9)	6/6n	0,0022		9	2	2	2	2	9	2	9	Q
Bromomethane	EPA 8010 (9)	6/6n	0,0032		9	2	9	9	2	9	2	2	2
Carbon Tetrachloride	EPA 8010 (9)	6/6n	0,0023		2	9	9	2	2	9	2	2	오
Chi crobenzene	EPA 8010 (9)	6/6n	0,0018		£	윷	2	9	2	2	2	윷	2
Chloroethane	EPA 8010 (9)	6/60	0,0019		2	2	2	2	2	9	9	2	Q
2-Chloroethylvinyl Ether	EPA 8010 (9)	6/6n	0,0022		Ç	Q	2	9	2	2	2	9	2
Chloroform	EPA 8010 (9)	6/6n	0,0022		2	2	2	9	2	9	9	9	9
Chloromethane	EPA 8010 (9)	6/60	0.0024		2	9	9	9	9	2	2	2	5
Dibromochioromethane	EPA 8010 (9)	6/6n	0_0016		2	2	9	2	9	2	9	Ð	9
1,2-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0014		9	9	9	9	2	2	g	2	2
1,3-Dichlorobenzene	EPA 8010 (9)	6/60	0,0021		9	9	9	9	2	2	2	2	ş
1 4-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0020		2	2	9	2	9	9	2	2	2
Dichlorodifluoromethane	EPA 8010 (9)	6/60	91 00*0		2	9	2	2	2	2	2	9	Q
1,1-Dichloroethane	EPA 8010 (9)	6/6n	0,0025		æ	9	9	9	2	9	ջ	2	0.016
1,2-Dichloroethane	EPA 8010 (9)	6/6n	0,0022		2	9	2	9	2	2	9	9	2
1,1-Dichloroethene	EPA 8010 (9)	6/6n	0,0025		Q	9	2	9	9	2	2	2	0,0075
trans-1,2-Dichloroethene	EPA 8010 (9)	6/6n	0,0021		2	9	9	9	9	9	2	2	0.14
1,2-Dichloropropane	EPA 8010 (9)	6/6n	0,0010		Ş	9	9	9	2	Ð	2	2	2
cis-1,3-Dichloropropene		₽gn	0.0048 (3)		2	2	9	9	2	9	9	Ð	2
trans-1,3-Dichioropropene	EPA 8010 (9)	ββn			•				!	9	į	!	9
Methylene Chloride	EPA 8010 (9)	6/6n	0,0017		9	9	2	2	2	2	2	€	2
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	6/6n	0,0019		2	2	2	2	2	2	2	2	Q
Tetrachi oroethene	EPA 8010 (9)	6/6n	0,0019		Q	2	9	9	0,38	9	2	2	Ş
1,1,1-Trichioroethane	EPA 8010 (9)	6/6n	0,0026		2	2	2	9	9	Ð	2	2	0.0042
1,1,2-Trichloroethane	EPA 8010 (9)	6/6n	0,0026		9	9	2	9	9	9	2	2	2
Trichloroethene (TCE)	EPA 8010 (9)	6/60	0,0030		9	2	2	9	2	2	2	2	0.010
Trichiorofluoromethane	EPA 8010 (9)	6/6n	0,0022		9	9	2	2	9	2	2	9	2
Vinyi Chloride	EPA 8010 (9)	6/60	0,0027		9	9	2	2	2	9	2	2	0.027

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

							94 5	84 ℃	8 4	B4-D	94	84 -0	B4- E
			Detection	Field #:	SS-38	SS-3C	2.5-4	5-6.5	7.5-9	2.5-4	5-6.5	7.59	2.5-4
Parameter	Method	Un its	Limit	Site :	THREE	THREE	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgeable Halocarbons	EPA 8010 (9)	6/6n	MDL (2)										
Bramodichloramethane	EPA 8010 (9)	6/6n	0,0018		⊋	2	2	2	2	₽	9	2	9
Bromoform	EPA 8010 (9)	6/6n	0,0022		9	2	9	9	9	9	9	9	Q
Bromomethane	EPA 8010 (9)	6/6n	0,0032		욮	2	2	9	2	9	2	2	9
Carbon Tetrachioride	EPA 8010 (9)	6/6n	0,0023		2	2	9	9	2	2	9	9	QN
Chlorobenzene	EPA 8010 (9)	6/6n	0,0018		9	2	2	æ	S	9	9	2	2
Chloroethane	EPA 8010 (9)	6/6n	0,0019		2	2	9	2	9	9	2	2	QN
2-Chloroethylvinyl Ether	EPA 8010 (9)	6/6n	0.0022		2	2	9	9	2	2	Q	Q	2
Chloroform	EPA 8010 (9)	6/6n	0,0022		2	0,0053	9	2	2	2	9	2	Q
Chlorome thane	EPA 8010 (9)		0.0024		9	9	9	9	2	9	9	2	2
Dibromochioromethane	EPA 8010 (9)	6/6n	0,0016		9	2	2	2	2	2	9	2	Q
1,2-Dichlorobenzene	EPA 8010 (9)	6/6n	0.0014		2	9	9	2	2	9	2	9	2
1,3-Dichlorobenzene	EPA 8010 (9)	6/6n	0.0021		2	2	2	9	2	9	9	2	⊋
1,4-Dichiorobenzene	EPA 8010 (9)	6/6n	0.0020		윷	9	9	2	2	2	9	2	9
Dichlorodifiuoromethane	EPA 8010 (9)	6/6n	0.0016		9	2	9	2	2	2	9	2	Q
1,1-Dichloroethane	EPA 8010 (9)	6/6n	0,0025		0,033	2	2	2	9	2	ş	9	9
1,2-Dichloroethane	EPA 8010 (9)	6/6n	0,0022		2	2	2	2	2	9	2	2	2
1,1-Dichloroethene	EPA 8010 (9)	6/60	0,0025		0.018	9	2	2	2	9	2	9	9
trans-1,2-Dichloroethene	EPA 8010 (9)	6/60	0,0021		0,0029	2	9	2	2	2	9	9	Q
1,2-Dichloropropane	EPA 8010 (9)	6/6n	0.0010		2	ᄝ	ş	욧	2	2	9	2	9
cis-1,3-Dichloropropene	EPA 8010 (9)		0,0048 (3)	•	2	Q	9	2	2	9	Ş	2	2
Method Chloride		6/6: 5/6:	7100.0		Ş	9	S	9	9	£	2	2	9
1.1.2.2-Tetrachloroethane	8010		0.0019		2	2	2	9	9	9	2	2	2
Tetrachloroethene	8010		0,0019		0,0019	9	2	2	Q	9	웆	9	9
1,1,1-Trichloroethane	EPA 8010 (9)		0,0026		1.5	0.013	9	9	2	2	2	9	Q
1,1,2-Trichloroethane	EPA 8010 (9)	6/60	0,0026		9	9	9	9	2	2	2	9	9
Trichloroethene (TCE)	EPA 8010 (9)	6/6n	0.0030		0.026	0,0053	9	9	2	2	9	2	Q
Trichi orofi uoromethane	EPA 8010 (9)	6/6n	0,0022		9	2	2	2	2	9	2	2	9
Viny! Chloride	EPA 8010 (9)	6/6n	0,0027		9	9	9	2	2	9	9	9	Q

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

			Detect ion	Field #:	B4-E 5-6.5	GW4-A 10-11.5	GW4-B 5-6.5	GW4-C 10-12	GW4-D 5-6.5	84-A 2.5-4	84-A 5-6-5	84-A	84-8 2,5-4
Parameter	Method	Un I ts	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgeable Halocarbons	EPA 8010 (9)	6/6n	MDL (2)										
Branodichioramethane	EPA 8010 (9)	6/60	0,0018		2	2	9	9	Q	2	9	9	ND(5)
Branoform	EPA 8010 (9)	6/6n	0,0022		9	9	9	2	2	2	2	2	Q
Bromomethane	EPA 8010 (9)	6/6n	0,0032		9	€	9	9	2	9	2	9	2
Carbon Tetrachloride	EPA 8010 (9)	6/6n	0,0023		2	9	9	2	9	9	2	9	QN
Ch! orobenzene	EPA 8010 (9)	6/6n	0,0018		9	9	₽	9	9	9	9	9	9
Chloroethane	EPA 8010 (9)	6/6n	0,0019		2	9	9	2	9	2	2	2	Q
2-Chloroethylvinyl Ether	EPA 8010 (9)	6/6n	0,0022		9	æ	2	9	2	Q	Ð	9	9
Chloroform	EPA 8010 (9)	6/6n	0,0022		9	9	9	9	9	9	9	2	Q
Chloramethane	EPA 8010 (9)	6/6n	0,0024		9	9	9	9	£	2	2	₽	9
Dibromochloromethane	EPA 8010 (9)	6/6n	0,0016		9	2	9	9	2	2	2	9	Q
1,2-Dichlorobenzene	EPA 8010 (9)	6/6n	0.0014		9	윷	2	₽	운	9	2	5	9
1,3-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0021		9	2	2	9	9	9	9	2	Q
1,4-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0020		9	9	9	9	2	9	9	9	9
Dichlorodifluoromethane	EPA 8010 (9)	6/6n	0,0016		2	2	2	9	2	2	2	9	Q
1,1-Dichloroethane	EPA 8010 (9)	6/6n	0,0025		9	9	운	9	2	9	웆	9	2
1,2-Dichloroethane	EPA 8010 (9)	6/6n	0,0022		2	9	2	2	2	2	2	2	Q
1,1-Dichloroethene	EPA 8010 (9)	6/6n	0,0025		2	윷	Q	9	₽	9	9	9	€
trans-1,2-Dichloroethene	EPA 8010 (9)	6/60	0,0021		2	2	9	9	2	2	2	9	Q
1,2-Dichloropropane	EPA 8010 (9)	6/6n	0.0010		9	9	2	9	9	2	9	2	2
cis-1,3-Dichloropropene	EPÁ 8010 (9)	6 √6n	0,0048 (3)		2	g	9	9	9	9	2	2	2
Methylene Chloride	8010	χ _{δη} ο	0.0017		2	2	£	9	0.079	2	Q	2	9
1,1,2,2-Tetrachloroethane	-	b/bn	0,0019		2	9	9	2	2	2	2	2	Q
Tetrach loroe thene	EPA 8010 (9)	6/6n	0,0019		2	9	0,013	ð	9	9	Ð	9	2
1,1,1-Trichloroethane	EPA 8010 (9)	g/gu	0,0026		2	Ş	9	2	9	2	9	2	Q
1,1,2-Trichloroethane	EPA 8010 (9)	g/gu	0,0026		9	9	9	⊋	용	2	9	2	₽
Trichloroethene (TCE)	EPA 8010 (9)	6/6n	0,0030		2	2	ş	9	2	2	9	2	Q
Trichlorofluoromethane	EPA 8010 (9)	6/6n	0,0022		Q	9	9	2	2	2	Ð	Z	Ş
Vinyl Chior ide	EPA 8010 (9)	6/6n	0.0077		₽	9	2	2	2	2	2	9	Q

DATACHEM AMALYTICAL REPORT Duluth IAP - Soil Samples

					84-18	84-8					GW5-A	GW5-B
			Detect Ion	Field #:	5-6.5	7.5-11.5	•	SS-4B	SS-4C	SS-40	5-6.5	9.5-11
Parameter	Method	Units	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FIVE	FIVE
Purgeable Halocarbons	EPA 8010 (9)	6/6n	MDL (2)									
Brandichloramethane	EPA 8010 (9)	6/6n	0,0018		ND (5)	9	2	Ş	9	9	9	9
Bromoform	EPA 8010 (9)	6/6n	0,0022		2	9	2	2	2	9	2	QN
Bromomethane	EPA 8010 (9)	6/6n	0,0032		9	9	2	2	2	2	2	9
Carbon Tetrachloride	EPA 8010 (9)	6/6n	0,0023		2	9	2	2	2	9	2	Q
Chlorobenzene	EPA 8010 (9)	6/6n	0,0018		9	9	9	9	9	2	9	9
Chloroethane	EPA 8010 (9)	6/6n	0,0019		2	9	9	9	2	9	9	Q
2-Chioroethylvinyl Ether	EPA 8010 (9)	6/6n	0,0022		Q	Q	Q	Q	9	Ð	2	9
Chloroform	EPA 8010 (9)	6/6n	0,0022		9	9	9	2	2	9	9	Q
Chloromethane	EPA 8010 (9)	6/6n	0,0024		9	Ð	9	2	æ	2	Z	2
Dibromochloromethane	EPA 8010 (9)	6/6n	91 00*0		9	9	2	9	2	2	9	QN
1,2-Dichlorobenzene	EPA 8010 (9)	6/6n	0.0014		Q	9	9	2	2	2	₽	9
1,3-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0021		2	9	g	9	9	2	9	Q
1,4-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0020		Ð	2	9	₽	9	윷	9	9
Dichlorodifluoromethane	EPA 8010 (9)	6/6n	0.0016		2	9	9	2	2	9	2	⊋
1,1-Dichloroethane	EPA 8010 (9)	6/6n	0.0025		Ð	Q	2	2	2	2	9	9
1,2-Dichloroethane	EPA 8010 (9)	6/6n	0,0022		2	9	2	2	2	2	9	Q
1,1-Dichloroethene	EPA 8010 (9)	6/6n	0,0025		9	9	Q	9	9	ᄝ	2	9
trans-1,2-Dichloroethene	EPA 8010 (9)	6/6n	0,0021		2	2	9	9	2	9	9	Q
1,2-Dichloropropane	EPA 8010 (9)	6/6n	0,0010		읒	ᄝ	9	2	2	9	오	9
cis-1,3-Dichloropropene	EPA 8010 (9)	6/6n	(3) 8000 0	_	Ş	Ş	Ş	Ę	Ş	9	Ş	9
frans-1, 3-Dichloropropene	EPA 8010 (9)	ηgγβ	0.00		2	9	9	?	<u> </u>)))
Methylene Chloride	EPA 8010 (9)	6/6n	0,0017		Q	9	2	2	2	2	2	2
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	6/6n	0,0019		2	2	9	9	9	2	2	Q
Tetrachloroethene	EPA 8010 (9)	6/6n	0,0019		9	9	£	Ð	9	윷	2	9
1,1,1-Trichloroethane	EPA 8010 (9)	6/6n	0,0026		2	9	9	9	9	2	9	QN
1,1,2-Trichiorosthane	EPA 8010 (9)	6/6n	0,0026		9	2	ş	9	Z	9	ş	QN
Trichloroethene (TCE)	EPA 8010 (9)	6/6n	0,0030		2	2	2	2	2	2	2	QN
Trichlorofluoromethane	EPA 8010 (9)	6/6n	0,0022		9	9	9	9	9	9	윷	₹
Vinyl Chtor ide	EPA 8010 (9)	6/6n	0,0027		2	9	9	9	2	2	2	9

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

					GW5-C						₽6-A	B6-A	19
			Detection	Field #:	10-11.5	SS-5A	82-88	SS-5C	88-50	SS-5E	0-1.5	2.5-4	0-1.5
Parameter	Method	un its	Limit	Site :	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	SIX	SIX	SIX
Purgeable Halocarbons	EPA 8010 (9)	6/6n	MDL (2)										
Bramodichloramethane	EPA 8010 (9)	6/6n	0,0018		2	9	운	£	9	2	2	2	Q
Bromoform	EPA 8010 (9)	6/6n	0,0022		9	9	2	2	2	9	9	9	Q
Brancesthane	EPA 8010 (9)	6/60	0,0032		æ	9	윷	읒	9	9	2	9	2
Carbon Tetrachloride	EPA 8010 (9)	6/6n	0,0023		2	2	9	2	2	9	9	9	Q
Chlorobenzene	EPA 8010 (9)	6/6n	0,0018		9	윷	2	2	⊋	9	9	2	9
Chloroethane	EPA 8010 (9)	6/6n	0,0019		2	9	9	9	2	2	9	2	Q
2-Chioroethylvinyl Ether	EPA 8010 (9)	6/6n	0,0022		9	9	2	£	£	₽	9	9	⊋
Chloroform	EPA 8010 (9)	6/6n	0,0022		2	2	2	9	9	2	9	9	Q
Chloromethane	EPA 8010 (9)	6/6n	0,0024		9	9	2	Q	2	9	9	2	9
Ofbromochioromethane	EPA 8010 (9)	6/60	0,0016		9	2	9	2	9	2	9	9	QN
1,2-Dichlorobenzene	EPA 8010 (9)	9/60	0,0014		2	2	₽	ᄝ	2	2	2	2	9
1,3-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0021		2	9	2	2	2	2	9	2	QN
i,4-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0020		æ	9	9	9	2	Ð	2	9	£
Dichlorodifluoromethane	EPA 8010 (9)	6/6n	0,0016		2	9	9	2	9	2	2	2	Q
1,1-Dichloroethane	EPA 8010 (9)	6/6n	0,0025		9	2	9	2	2	9	9	9	2
1,2-Dichloroethane	EPA 8010 (9)	6/6n	0,0022		2	9	2	2	2	2	9	2	9
1,1-Dichloroethene	EPA 8010 (9)	6/6n	0,0025		9	9	2	9	Q	9	Q	2	9
trans-1,2-Dichloroethene	EPA 8010 (9)	6/6n	0,0021		2	9	2	9	2	2	2	2	9
i,2-Dichloropropane	EPA 8010 (9)	6/6n	0,0010		2	Q	2	Ð	2	9	2	2	Ð
cis-1,3-Dichloropropene	8010	ηĝή	0.0048 (3		Ş	Ş	2	9	Q	9	9	9	9
trans-1,3-Dichloropropene	EPA 8010 (9)	6√6n	•		<u>;</u>	<u>}</u>	<u>}</u>	!	?	ļ	!	<u></u>)
Methylene Chloride	EPA 8010 (9)	6/6n	0,0017		9	9	£	위	2	ş	9	2	9
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	6/6n	0,0019		2	9	2	2	2	2	2	2	ş
Tetrachi oroethene	EPA 8010 (9)	6/6n	0,0019		₹	9	9	9	9	2	2	£	2
1,1,1-Trichloroethane	EPA 8010 (9)	6/6n	0,0026		9	9	9	2	2	2	9	2	9
1,1,2-Trichloroethane	EPA 8010 (9)	6/6n	0,0026		Ð	2	9	9	9	웃	읒	£	Z
Trichloroethene (TCE)	EPA 8010 (9)	6/60	0,0030		2	9	2	9	2	2	2	2	읒
Trichi arofi uoramethane	EPA 8010 (9)	6/6n	0,0022		9	9	9	9	9	2	2	읒	2
Vinyi Chlor ide	EPA 8010 (9)	6/6n	0,0027		2	2	9	2	9	2	9	9	Q

DATACHEM AMALYFICAL REPORT Duluth IAP = Soil Samples

					86-43	B7-A	87 -A	B7 +B	B7 +B	GW7 A	GW7-B	C#1	
			Detection	Fi⊌ld #:	2.5-4	0-1.5	2.5-4	0-1.5	2.5-4	10-11,5	10-11.5	15-16.5	SS-7A*
Parameter	Method	Un 1+s	Limit	Site :	SIX	SEVEN	SEVEN						
Purge able Halocarbons	EPA 8010 (9)	6/60	MDL (2)										
Branodichioramethane	EPA 8010 (9)	6/6n	0,0018		Q	Ð	身	Ð	¥	9	¥	⊋	Ð
Bromoform	EPA 8010 (9)	6/6n	0,0022		2	2	⊋	Q.	9	9	9	2	ON.
Branamethane	EPA 8010 (9)	6/bn	0,0052		Î	₹	2	Ş	2	9	Q	S	€
Carbon Tetrachloride	EPA 8010 (9)	6/6n	0.0023		3	Î	2	2	2	9	2	2	ON
Ch I oroben zene	EPA 8010 (9)	6/6n	0,0018		2	9	9	₹	S	Ð	Q	9	Q
Chloroethane	EPA 8010 (9)	6/6n	0,0019		9	⊋	Q	7	2	9	9	2	QN
2-Chloroethylvinyl Ether	EPA 8010 (9)	6/6n	0.0022		Ð	₽	오	9	⊋	Q	Q	⊋	2
Chloroform	EPA 8010 (9)	6/6n	0,0022		9	Ð	2	9	윷	2	2	9	QN
Chloromethane	EPA 8010 (9)	6/bn	0.0024		2	ON	Q	Ð	9	Q	9	9	ᄝ
Dibramochioramethane	EPA 8010 (9)	6/6n	0.0016		2	Ð	2	9	2	9	2	2	QN
1,2-Dichlorobenzene	EPA 8010 (9)	6/6n	0.0014		Q	Ð	Ð	ð	9	Q	ð	Ð	Q
1,3-Dichlorobenzene	EPA 8010 (9)	6/61	0.0021		2	2	2	2	2	2	9	2	QN
1,4-Dichlorobenzene	EPA 8010 (9)	6/6n	0.0020		2	2	9	9	g	£	Z	₽	Q
Dichlorodifiuoromethane	EPA 8010 (9)	6/6n	0.0016		₹	9	Ç	₹	⊋	2	2	2	Q
1,1-Dichloroethane	EPA 8010 (9)	6/bn	0,0025		Ģ	9	Ð	₽	ð	ᄝ	9	Q	⊋
1,2-Dichloroethane	EPA 8010 (9)	6/6n	0.0022		⊋	2	2	2	æ	2	2	2	0,0070
1,1-Dichloroethene	EPA 8010 (9)	6/6n	0.0025		Ð	₹	Q	2	2	2	Ş	2	Ş
trans-1,2-Dichloroethene	EPA 8010 (9)	6/6n	0,0021		€	3	9	9	9	9	2	2	0.024
1,2-Dichloropropane	EPA 8010 (9)	6/6n	0.0010		⊋	Q	Q	⊋	Q	9	ð	2	₹
cis-1,3-0ichloropropene	EPA 8010 (9)	6/6n	0.0048 (3)		S	Ê	Ş	Ę	Ş	2	Q	S	CN
trans-1,3-Dichloropropene	EPA 8010 (9)	6/6n	0.000	•	è	2	2	2	9	9	2	<u> </u>	2
Methylene Chloride	EPA 8010 (9)	6/6n	0.0017		Ð	QN	Q	9	Q	2	9	2	2
1, 1, 2, 2-Tetrachloroethane	EPA 8010 (9)	6/6n	0.0019		⊋	⊋	9	⊋	2	2	9	₹	Q
Tetrachloroethene	EPA 8010 (9)	6/6n	0,0019		Ð	0.0035	Q	Ð	2	ᄝ	2	₹	Ð
1,1,1-Trichloroethane	EPA 8010 (9)	6/6n	0,0026		3	9	2	Ð	¥	9	2	9	QN
1,1,2-Trichi oroethane	EPA 8010 (9)	6/6n	0,0026		⊋	Ð	Q	2	2	⊋	2	9	2
Trichloroethene (TCE)	EPA 8010 (9)	b/bn	0,0030		2	9	2	⊋	2	9	9	2	ON.
Trichlorofluoromethane	EPA 8010 '9)	6/6n	0.0022		Q	9	윷	Ð	2	9	ş	2	ş
Vinyi Chlor ide	EPA 8010 (9)	6/6n	0,0027		9	2	9	Ð	9	2	2	2	QN

^{*} Rev 1 sed 07/10/87

DATACHEM ANALYTICAL REPORT Duluth IAP ~ Soil Samples

				. . .	B8-A	88 -A	B8~A	P8-8	88-8 5-4	88 1	GWB-A	GW8-8	GW8-C
Parameter	Method	Units	(imit	Site :	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT
Purgeable Halocarbons	EPA 8010 (9)	6/6n	MDL (2)										
Branodichlorame thane	EPA 8010 (9)	6/6n	0,0018		Ð	2	2	2	2	2	2	2	9
Bromoform	EPA 8010 (9)	6/6n	0,0022		2	2	9	9	9	2	9	2	QN
Browome thane	EPA 8010 (9)	6/6n	0,0032		2	9	9	9	9	9	9	윷	9
Carbon Tetrachloride	EPA 8010 (9)	6/6n	0,0023		2	9	9	2	2	2	9	2	Q
Chlorobenzene	EPA 8010 (9)	6/6n	0,0018		2	2	Q	9	S	9	2	9	2
Chloroethane	EPA 8010 (9)	6/6n	0,0019		9	9	2	2	2	2	2	2	Q
2-Chloroethylvinyl Ether	EPA 8010 (9)	6/6n	0,0022		2	9	2	⊋	9	Ð	2	皇	읒
Chloroform	EPA 8010 (9)	6/6n	0,0022		2	9	2	2	2	2	2	2	Q
Chloromethane	EPA 8010 (9)	6/6n	0,0024		2	욮	2	2	2	2	9	Ş	9
Dibromochioromethane	EPA 8010 (9)	6/6n	0,0016		2	9	2	2	2	2	2	2	9
1,2-Dichlorobenzene	EPA 8010 (9)	6/6n	0.0014		2	æ	9	Q	9	2	9	9	2
1,3-Dichlorobenzene	EPA 8010 (9)	6/60	0,0021		2	9	9	9	2	Ð	9	9	Q
1,4-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0020		9	윷	₽	Q	9	9	9	윷	2
Dichlorodi fluoromethane	EPA 8010 (9)	6/6n	0,0016		2	9	2	9	2	2	2	9	Q
1,1-Dichloroethane	EPA 8010 (9)	6/bn	0,0025		9	₽	Ð	9	9	9	2	2	2
1,2-Dichloroethane	EPA 8010 (9)	6/60	0,0022		2	9	9	2	2	9	2	2	웆
1,1-Dichloroethene	EPA 8010 (9)	6/6n	0,0025		₹	9	2	Q	9	⊋	2	용	9
trans-1,2-Dichloroethene	EPA 8010 (9)	6/6n	0,0021		9	2	2	2	2	2	9	9	Q
1,2-Dichloropropane	EPA 8010 (9)	6/6n	0,0010		ş	₽	윤	2	9	2	9	9	2
cis-1,3-Dichloropropene	8010	6√6n	0,0048 (3)		Q	9	9	Q	9	2	S	9	ð
Trans-1, 3-01 chi or opropene	200	₽6n			Ş	Ç	Ş	Ş	Ş	Ş	Ş	Ş	Ş
Me thy lene Chioride	9010	₽, g	0.000		2 9	2 9	2 9	2 5	2 2	2	9 9	2	2 2
1,1,2,2-Tetrachloroethane	8010	6/6n	0.0019		9	2 !	2 !	⊋ !	⊋ !	2 !	2 9	? !	2 9
Tetrachloroethene	EPA 8010 (9)	6/6n	0,0019		9	2	ş	9	2	9	2	₹	2
1, 1, 1-Tr ichioroethane	EPA 8010 (9)	6/6n	0,0026		2	2	2	2	9	9	2	9	2
1,1,2-Trichloroethane	EPA 8010 (9)	9/gu	0,0026		9	용	윷	2	2	9	윷	9	2
Trichloroethene (TCE)	EPA 8010 (9)	6/6n	0,0030		9	2	2	2	2	2	2	2	2
Trichlorofluoromethane	EPA 8010 (9)	6/6n	0,0022		2	욧	용	9	2	2	£	2	9
Vinyl Chloride	EPA 8010 (9)	6/6n	0,0027		9	9	2	2	9	9	2	9	Q

DATACHBA ANALYTICAL REPORT Duluth 1AP - Soil Samples

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			Detection	Field#:	SS-8A*	SS-8B*
Par ane ter	Method	u ts	Limit	Si te :	EI GH	EI GHT
Purgeable Halocarbons	EPA 8010 (9)	6/6n	MDL (2)			
Bromodichioromethane	EPA 8010 (9)	6/6n	0.0018		⊋	QN
Branoform	EPA 8010 (9)	6/6n	0,0022		읒	Q
Bronomethane	EPA 8010 (9)	6/6n	0,0032		9	QN
Carbon Tetrachloride	EPA 8010 (9)	6/6n	0,0023		£	2
Chlorobenzene	EPA 8010 (9)	6/6n	0,0018		9	Q
Chi oroethane	EPA 8010 (9)	6/bn	0,0019		9	Q
2-Chloroethylvinyl Ether	EPA 8010 (9)	6/6n	0,0022		Ð	QN
Chloroform	EPA 8010 (9)	6/6n	0.0022		Ð	⊋
Chloromethane	EPA 8010 (9)	6/6n	0.0024		9	QN
Dibramoch! orane than e	EPA 8010 (9)	6/bn	0,0016		9	Q
1,2-Dichlorobenzene	EPA 8010 (9)	6/6n	0.0014		£	QN
1,3-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0021		9	Q
1,4-Dichlorobenzene	EPA 8010 (9)	6/6n	0,0020		2	QN
Dichlorodiftuoromethane	EPA 8010 (9)	6/6n	0.0016		Ð	Q
1,1-Dichloroethane	EPA 8010 (9)	6/6n	0,0025		2	QN
1,2-Dichioroethane	EPA 8010 (9)	6/6n	0,0022		Ş	Q
1,1-Dichloroethene	EPA 8010 (9)	6/6n	0.0025		9	QN
trans-1,2-Dichloroethene	EPA 8010 (9)	6/6n	0.0021		₽	Q
1,2-Dichloropropane	EPA 8010 (9)	6/6n	0.0010		9	QN
cis-1,3-0ichioropropene	EPA 8010 (9)	6/6n	(X) 8000 0		Ş	Ş
trans-1,3-Dichloropropene	EPA 8010 (9)	6/6n	0.0400.0		Ē	2
Methylene Chloride	EPA 8010 (9)	6/6n	0.0017		Q	Q
1, 1, 2, 2-Tetrachloroethane	EPA 8010 (9)	6/6n	0.0019		2	QN
Tetrachl oroethene	EPA 8010 (9)	6/6n	0.0019		æ	9
1,1,1-Trichloroethane	EPA 8010 (9)	6/6n	0.0026		S	QN
1,1,2-Trichloroethane	EPA 8010 (9)	6/6n	0,0026		Q	ON
Trichloroethene (TCE)	EPA 8010 (9)	g/gu	0,0030		9	QN
Trichlorofluoromethane	EPA 8010 (9)	6/6n	0.0022		₽	Q
Vinyl Chloride	EPA 8010 (9)	6/60	0,0027		2	Q

* Revised 07/10/87

DATACHEM MALYTICAL REPORT Duluth IAP - Soil Samples

					B1-A	B1-A	B1-A	GW1-A	GW1-B	GW1-E			82-8
			Detect Ion	Fleid#:	0-1.5	2.54	5-6.5	10-11,5	5-6.5	20-21,5	SS-1A	SS-1B	0-1-5
Parameter	Method	Un its	Limit	Site :	ONE	ONE	ONE	ONE	ONE	ONE	ONE	ONE	OM
Purgeable Arometics	EPA 8020 (9)	6/6n	MDL (2										
Benzene	EPA 8020 (9)	6/6n	0.0013		ᄝ	₽	9	2	ð	2	0,0071	2	Q
Chlorobenzene	EPA 8020 (9)	6/6n	0,0018		2	2	2	9	2	2	2	9	QN
1,2-Dichlorobenzene		6/6n	0,0023		9	9	9	9	운	9	Ð	2	9
1,3-Dichlorobenzene	EPA 8020 (9)	6/6n	0.0046		2	9	9	2	2	2	2	9	Q
1,4-Dichlorobenzene	EPA 8020 (9)	6/6n	0,0022		2	9	2	ð	9	2	2	Ð	2
Ethy i benzene	EPA 8020 (9)	6/6n	0,0038		2	2	0.043	2	2	2	2	2	Q
Toluene	EPA 8020 (9)	6/6n	0,0032		9	2	0.094	9	웆	2	0.10	0.1	9
m-Xylene	EPA 8020 (9)	6 ∕ 6n											
o-Xylene	EPA 8020 (9)	6/6n	0,0061(4)		2	욧	0.043	2	9	⊋	9	2	Ð
D-Xv lene		βbn											

DATACHBA ANALYT ICAL REPORT Duluth IAP - Soll Samples

					R7-R	A2-A	A2-C	R2_C	H2-C	A-CM2	CMC)-CM2	CW2-0
			Detect ion	Field #:	2.54	5-6.5	0-1-5	2.54	5-6.5	5-6.5	7-6-5	15-16.5	15-16.5
Parameter	Method	th its	Limit	Site :	OM.	OMI	OM.	OMT.	OML	TWO	DMT	OML	TWO
Purgeable Aromatics	EPA 8020 (9)	6/6n	MDL (2)										
Benzene	EPA 8020 (9)	6/6n	0,0013		Ð	9	0.014	9	2	Q	Ş	9	ð
Chi oroben zene	EPA 8020 (9)	6/6n	0,0018		2	9	2	9	2	2	2	2	QN
1,2-Dichlorobenzene	EPA 8020 (9)	6/6n	0,0023		Ð	Q	9	9	9	Ş	9	9	9
1,3-Dichlorobenzene	EPA 8020 (9)	6/6n	0,0046		9	9	2	9	9	2	2	9	Q
1,4-Dichlorobenzene	EPA 8020 (9)	6/6n	0,0022		9	9	9	€	2	Q	윤	9	9
Ethylbenzene	EPA 8020 (9)	6/6n	0,0038		9	2	0.35	2	0.011	9	9	9	ş
Toluene	EPA 8020 (9)	6/6n	0,0032		2	Ð	0,54	2	0,0088	9	£	2	9
m-Xy lene	EPA 8020 (9)	6√6n											
o-Xy lene	EPA 8020 (9)	g/gu	0,0061(4)		Q	9	8.	웆	0.076	2	9	윷	₽
p-Xy lene	EPA 8020 (9)	φøn											

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DATACHEM MALYTICAL REPORT

83-8 2,5-4 THREE	9999999
83-8 0-1.5 THREE	2 2 2 2 2 2 2
B3-A 5-6.5 THREE	5 5 5 5 5 5 5 ° 6 ° 6 ° 6 ° 6 ° 6 ° 6 °
83-A 2.5-4 THREE	3 3 3 3 3 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
83-A 0-1.5 THREE	0.057
SS-2C	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
SS-ZB TWO	3 3 3 3 3 9 9 5 80 5
SS-2A TWO	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
GW2-E 15-16.5 TWO	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Field #: Site :	
Detection Limit	MDL (2 0,0015 0,0016 0,0025 0,0046 0,0022 0,0038 0,0032
un its	\$/6n 6/6n 6/6n 6/6n 6/6n 6/6n 6/6n 6/6n
Ne trod	EPA 8020 (9) UEPA 8020 UEPA 8020 (9) UEPA 8020 (9) UEPA 8020 (9) UEPA 8020 (9) UEPA 80
Parameter	Purgeable Aromatics Benzene Chiorobenzene 1,2-01chiorobenzene 1,4-01chiorobenzene 1,4-01chiorobenzene Ethylbenzene Toluene ne-Xylene o-Xylene

DATACHBA AMALYTICAL REPORT Duluth IAP - Soit Samples

					83-8	B3-C	83-C	B3-C	83-C	GW3-A	GW3-B	GW3-D	
			Detect lon	Field #:	5-6.5	0-1.5	2.54	5-6.5	5-6.5	5-6.5	5-6.5	5-6.5	SS-3A
Parometer	Method	ST ITS	Limit	Site :	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE
Purgeable Arometics	EPA 8020 (9)	6/6n	MDL (2										
Benzene		0/00	0,0013		₽	2	2	Q	9	9	Ş	2	9
		b/bn	0,0018		2	2	2	2	2	9	2	2	QN
1.2-Dicht grobenzene		6/bn	0,0023		Ð	2	9	Q	ð	9	9	9	2
		0/bn	0,0046		9	2	2	9	2	2	2	9	Q
1 4-Dich probanzana		0/00	0,0022		£	æ	9	9	9	윷	ş	g	9
F+hv-lbenzene		5/5n	0,0038		2	2	9	9	2	2	9	2	Ş
Totuene	EPA 8020 (9)	6/6n	0,0032		2	욧	Ð	Q	Q	9	2	9	0.014
m-Xy lene		₽6n							!	•	į	ç	ç
o-Xy tene		6/6 n	0,006114		2	2	2	9	윤	2	2	2	2
p-Xylene		6/6n											

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

							B4-C	84 5	84 C	84-0	84-D	B4 -0	84-E
			Detect Ion	Field #:	SS-3B	SS-3C	2.5-4	5-6.5	7.5-9	2.5-4	5-6.5	7.5-9	2,5-4
Parameter	Method	Units	Limit	Site :	THREE	THREE	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgeable Aromatics	EPA 8020 (9)		MDL (2)										
Benzene	EPA 8020 (9)		0,0013		윷	₽	9	욮	9	2	9	2	Q
Chlorobenzene			0,0018		9	2	9	2	2	2	9	2	욧
1,2-0ichlorobenzene			0,0023		2	Ş	₽	2	윤	S	2	딮	9
1,3-Dichlorobenzene			0,0046		9	2	9	2	2	9	9	9	Q
1,4-Dichlorobenzene	EPA 8020 (9)	6/60	0,0022		읖	Ð	9	9	Q	£	9	2	9
Ethylbenzene			0,0038		9	2	2	2	9	2	2	2	QN
Toluene			0.0032		9	9	2	2	2	2	9	2	9
m-Xy lene		6/6n			2	9	9	2	2	9	9	2	QN
o-Xy lene	EPA 8020 (9)	g/gu	0,0061(4)		9	2	9	9	2	Ð	9	2	9
p-Xy lene		6/6n			2	2	9	2	9	9	2	2	QV

DATACHEM MULLYFICAL REPORT Duluth IAP - Soit Samples

B4−A	7 5.0
B4-A	3 7 3
B4-A	4
GW4-D	
GW4-C	4
GW4-B	,
GW4-A	
B4-E	

Parameter	bott eM	Units D	Detection Limit	Fleid#: Site :	84-E 5-6.5 FOUR	GW4-A 10-11.5 FOUR	5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-0 5-6.5 FOUR	84-A 2.5-4 FOUR	84-A 5-6.5 FOUR	84-A 7.5-9 FOUR	2, 5-4 FOUR
Purgeable Arcmatics	EPA 8020 (9)		MDL (2)		Q	£	9	9	Q	ð	9	Q	1,6 (5)
Benzene Chi orobenzene	EPA 8020 (9)		0,0018		2 2	9 9	9 9	2 2	2 2	99	9	9 9	9 9
1,2-Dichlorobanzene	EPA 8020 (9) EPA 8020 (9)		0,0046		9	9	9	2	2	9 !	2 9	9 9	ON S
1,4-Dichlorobenzene	EPA 8020 (9)		0.0022		9 9	9 9	2 2	2 2	2 2	2 2	2 2	2 2	3.2
Ethylbenzene Toluene	EPA 8020 (9)		0.0032		Q	Q	QN	Ð	2	9	Q	6600 0	6.4
a-Xylene	EPA 8020 (9) EPA 8020 (9)	6/6n	0,0061(4)		2	Ð	9	Q	Q	9	Q	0.21	82.
erel × X-0	EPA 8020 (9)	6/6n											

DATACHEN ANALYTICAL REPORT Duluth IAP - Soil Samples

GW5-8 9.5-11 FIVE	ON O	
GW5-A 5-6.5 FIVE	9999999	
SS-40 FOUR	8.8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	
SS-4C FOUR	ON O	
SS-48 FOUR	6.8 ND ND ND 170 170 170	
SS-4A FOUR	222222	
84-8 7.5-11.5 FOUR	00 00 00 00 00 00 00 00 00 00 00 00 00	
84-8 5-6.5 FOUR	MD (5)	
Fleid#: Site :	^	
Detect ion Limit	MDL (2) 0,0013 0,0018 0,0025 0,0022 0,0038 0,0032	
th ts	6/6n 6/6n 6/6n 6/6n 6/6n 6/6n 6/6n 6/6n	
Method	EPA 8020 (9)	
Parameter	Purgeable Aromatics Benzene Chlorobenzene 1,2-Dichlorobenzene 1,4-Dichlorobenzene 1,4-Dichlorobenzene Ethylbenzene Toluene m-Xylene p-Xylene	

					GW5-C						B6-A	P A	4
			Detect Ion	Fleid #:	10-11.5	SS-5A	SS-58	SS-5C	55-50	55-5F	5-1-0	. 4	3 5
Parameter	Method	E its	Limit	Site :	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	SIX	XIS	XIS XIS
Purgeable Aromatics	EPA 8020 (9)	6/60	MDL (3										
Benzene	EPA 8020 (9)	6/6n	0.0013		2	2	Q	Ş	Ş	9	S	9	9
Chlorobenzene	EPA 8020 (9)	6/60	0,0018		9	9	9	9	9 9	9 9	9 9	2 9	2 9
1,2-Dichlorobenzene	EPA 8020 (9)	6/60	0,0023		9	9	9	9	9 9	€ €	2 5	2 9	5 5
1,3-Dichlorobenzene	EPA 8020 (9)	6/6n	0,0046		2	2	2	9	9	2	2 2	2 9	2 9
1,4-Dichlorobenzene	EPA 8020 (9)	6/61	0,0022		9	2	9	9	2	9 9	2 €	9 9	2 9
Ethylbenzene	EPA 8020 (9)	6/6n	0,0038		2	2	9	9	2	2 2	2 2	<u> </u>	2 5
Toluene	EPA 8020 (9)	6/6n	0,0032		₹	Q	2	£	9 2	9 9	9 9	2 2	2 5
m-Xy lene	EPA 8020 (9)	6 60					!	!)	9	<u>}</u>	2	2
O-Xy I ene	EPA 8020 (9)	6/6n	0,0061(4)		2	9	9	2	Ş	Ş	g	ş	ş
p-Xylene	EPA 8020 (9)	no/e)	!	<u>)</u>	2	<u>}</u>	2	⋛

DATACHEN ANALYTICAL REPORT Duluth IAP - Soll Samples

SS-7A*	9999999
GW7-C 15-16.5 SEVEN	9999999
GW7-B 10-11.5 SEVEN	9999999
GW7-A 10-11.5 SEVEN	9999999
2.5-4 SEVEN	9999999
87-8 0-1.5 SEVEN	9999999 9
87-A 2.5-4 SEVEN	2 2 2 2 2 2 2 2
87-A 0-1.5 SEVEN	2 2 2 2 2 2 2 2
86-8 2.54 SIX	<u> </u>
Fleid #: Site :	
Detection	MDL (2) 0,0013 0,0018 0,0023 0,0046 0,0022 0,0038 0,0038
ا ا	6/6n 6/6n 6/6n 6/6n 6/6n 6/6n 6/6n 6/6n
Me thod	EPA 8020 (9)
Parameter	Purgeable Aromatics Benzene Chioroben zene 1,2-Dichi oroben zene 1,3-Dichi oroben zene 1,4-Dichi oroben zene Ethyiben zene Toi uene m-Xylene o-Xylene p-Xylene

* Rev I sed 07/10/87

DATACHEM AMALYTICAL REPORT Duluth IAP - Soll Samples

Purgable Aromatics Benzene Chlorobenzene 1,2-0ichlorobenzene	- •	Limit Limit MDL (2) 0,0013 0,0023 0,0046	Field #: Sita ::	88-A 0-1.5 EIGHT ND ND ND	88-A 2.5-4 EIGHT ND ND ND	88-A 5-6.5 EIGHT ND ND ND	88 4 6-1-5 FIGHT	88-8 2.5-4 1.5-4 ND ND N	88 4 F. 64.5 F. 64.5 F	6W8-A 5-6.5 E1GHT ND ND	648-8 10-11.5 FEIGHT ND ND	GWB-C 10-11.5 E1GHT ND ND ND
1,4-Dichiorobenzene Ethylbenzene Toluene m-Xylene o-Xylene	\$/6n 6/6n 6/6n 6/6n 6/6n	0,0022 0,0038 0,0032 0,0061(4)		9 9 9 9	99999	9999	2222	99999	222 2	2222 2	2	

DATACHEM ANALYTICAL REPORT Duluth IAP ~ Soll Samples

			Detection			SS-8B*	
Par and ter	Met hod	un i ts	Limit	Si te :	EI GHT	EI GHT	
Purgeable Archatics	EPA 8020 (9)		MDL (2)				
Ben zene	EPA 8020 (9)		0,0013		9	QN	
Chlorobenzene	EPA 8020 (9)		0,0018		Q	Ð	
1,2-Dichlorobenzene	EPA 8020 (9)		0,0023		9	QN	
1,3-Dichlorobenzene	EPA 8020 (9)		0.0046		욮	9	
1,4-Dichlorobenzene	EPA 8020 (9)		0.0020		9	QN	
Ethy I benzene	EPA 8020 (9)		0,0038		Q	2	
Toluene	EPA 8020 (9)	6/6n	0,0032		2	9.4	
m-Xy lene	EPA 8020 (9)						
o-Xy lene	EPA 8020 (9)		0,0061(4)		2	ON	
p-Xylene	EPA 8020 (9)						

* Revised 07/10/87

DATACHEM AMALYTICAL REPORT Duluth IAP - Soil Semples

					B1-A	B1-A	B1-A	GW1-A	G-176	GW1-E		
			Detect ion	Field #:	0-1.5	2.5-4	5-6.5	10-11.5	5-6.5	20-21.5	SS-1A	SS-1B
Parameter	Method	Un I ts	Limit	Site :	ONE	ONE	ONE	ONE	ONE	ONE	ONE	ONE
Pesticides	EPA 3550/8080 (9)	6/6n	MDL (2)									
Aldrin	EPA 3550/8080 (9)	6/6n	0.002		9	2	æ	9	2	2	2	2
al pha-8HC	EPA 3550/8080 (9)	6/6n	0,0008		9	2	₽	2	⊋	2	2	QN
beta-BHC	EPA 3550/8080 (9)	g/gu	0.0002		9	2	2	9	9	2	2	2
del ta-BHC	EPA 3550/8080 (9)	6/6n	900000		Ð	2	Ş	2	2	2	2	QN
Lindane	EPA 3550/8080 (9)	6/6n	0,003		9	9	2	2	2	9	9	9
Chlordane	EPA 3550/8080 (9)	6/6n	0.05		2	2	9	2	2	2	2	QN
4,4'-000	EPA 3550/8080 (9)	6/6n	0,0004		2	0.02	9	9	9	2	2	9
4,4'-00€	EPA 3550/8080 (9)	6/6n	0,007		2	0.02	2	2	2	2	9	QN
4 ,4 '-DDT	EPA 3550/8080 (9)	g/gu	0.004		2	0.02	9	9	9	2	9	Q
Dieldrin	EPA 3550/8080 (9)	6/6n	0,003		0.10	9	2	9	2	9	2	QN
Endosultan	EPA 3550/8080 (9)	g/gu	0.002		2	9	9	9	2	9	2	Q
Endosultan 11	EPA 3550/8080 (9)	6/6n	0.001		2	Ş	2	2	2	Ð	2	QN
Endosultan Sultate	EPA 3550/8080 (9)	6/6n	0.02		2	2	2	9	2	2	2	2
Endrin	EPA 3550/8080 (9)	6/6n	0,005		2	2	2	9	Ş	2	2	QN
Endrin Aldehyde	EPA 3550/8080 (9)	6/6n	0.02		2	9	2	₽	2	2	9	9
Heptachlor	EPA 3550/8080 (9)	6/6n	0.004		9	9	2	2	9	2	2	Q
Heptachlor Epoxide	EPA 3550/8080 (9)	6/60	0.002		9	9	2	Ð	2	2	2	2
Toxaphene	EPA 3550/8080 (9)	6/6n	0.14		9	2	2	2	9	2	2	Q
Arochlor 1016	EPA 3550/8080 (9)	6/6n	0.02		9	Ş	Ð	Ş	2	2	Ð	Q
Arochior 1221	EPA 3550/8080 (9)	6/6n	0.02		2	2	2	2	2	9	2	QN
Arochior 1232	EPA 3550/8080 (9)	6/6n	0.02		9	2	2	9	9	2	2	2
Arochior 1242	EPA 3550/8080 (9)	b/bn	0.02		Ð	2	2	2	9	9	9	QN
Arochior 1248	EPA 3550/8080 (9)	6/bn	0.02		9	2	2	2	9	9	2	9
Arochior 1254	EPA 3550/8080 (9)	6/6n	0.02		2	2	2	2	9	9	2	Q
Arochior 1260	EPA 3550/8080 (9)	6/6n	0.02		2	9	9	9	2	2	9	2

DATACHEM AVALYTICAL REPORT Duluth IAP - Soil Samples

					B3-A	83-A	83-A	B3-8	83-8	83-8	83-C	85-C	B3-C
			Detect ion	Field #:	0-1.5	2.54	5-6.5	0-1-5	2.5-4	5-6.5	0-1.5	2.5-4	5-6.5
Parameter	Method	Un i ts	Limit	Site :	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE
Pesticides	EPA 3550/8080 (9)	6/6n	MDL (2)										
Aldrin	EPA 3550/8080 (9)	g/gu	0,002		Q	Ş	9	Ş	Ş	æ	Ş	9	2
alpha-BHC	EPA 3550/8080 (9)	6/6n	0,0008		2	9	9	9	9	Ð	2	2	QN
bete-8HC	EPA 3550/8080 (9)	g/gu	0,0002		2	9	9	9	2	9	2	2	2
delta-BHC	EPA 3550/8080 (9)	6/6n	9000*0		¥	9	9	9	2	2	2	2	0,002
Lindane	EPA 3550/8080 (9)	6/6n	0,003		2	웆	9	Q	9	읒	9	æ	ð
Chlordane	EPA 3550/8080 (9)	6/6n	0.05		2	₽	9	2	2	9	9	2	QN
4,4'-000	EPA 3550/8080 (9)	6/6n	0.0004		2	2	9	0.41	2.1	9	2	2	9
4,4'-DDE	EPA 3550/8080 (9)	6/6n	0,007		⊋	9	2	9	2	9	9	2	0°008
4,4'-DOT	EPA 3550/8080 (9)	6/6n	0.004		0.01	9	9	0.08	2	2	0.10	60.0	Q
Dieldrin	EPA 3550/8080 (9)	6/6n	0,003		₽	2	9	9	2	9	9	9	Q
Endosultan 1	EPA 3550/8080 (9)	9/gn	0,002		2	Ð	2	9	2	9	2	2	9
Endosul fan 11	EPA 3550/8080 (9)	6/6n	0,001		2	2	9	2	2	9	2	5	NO
Endosultan Sultate	EPA 3550/8080 (9)	g/gu	0.02		₽	9	9	9	2	9	2	9	ð
Endrin	EPA 3550/8080 (9)	6/6n	0,005		2	2	2	9	2	9	2	9	QN
Endrin Aldehyde	EPA 3550/8080 (9)	6/6n	0.02		9	9	9	9	2	9	9	2	9
Heptachlor	EPA 3550/8080 (9)	6/6n	0.004		9	2	9	2	2	9	9	2	Q
Heptachlor Epoxide	EPA 3550/8080 (9)	6/6n	0.002		9	2	2	9	2	9	2	2	9
Toxaphene	EPA 3550/8080 (9)	6/6n	0.14		Q	2	2	2	2	9	9	9	Q
Arochlor 1016	EPA 3550/8080 (9)	6/bn	0.02		9	æ	9	9	2	2	2	2	9
Arochlor 1221	EPA 3550/8080 (9)	6/6n	0.02		₽	Ð	2	2	æ	2	9	2	QN
Arochlor 1232	EPA 3550/8080 (9)	9/gu	0.02		æ	9	9	9	2	2	2	2	9
Arochior 1242	EPA 3550/8080 (9)	6/6n	0.02		Q	2	Ð	2	9	2	9	9	QN
Arochlor 1248	EPA 3550/8080 (9)	6/6n	0.02		9	9	9	9	2	2	2	2	Q
Arochior 1254	EPA 3550/8080 (9)	6/6n	0.02		Q	2	9	2	2	2	2	9	Q
Arochior 1260	EPA 3550/8080 (9)	6/60	0.02		Ä	9	2	9	9	9	Q	ş	2

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Semples

					BC-3	G#3-A	GW3-B	GW3-D			
			Detection	Field #:	5-6.5	5-6.5	5-6.5	5-6.5	SS-3A	SS-3B	SS-3C
	Me†hod	Un I†s	Limit	Site :	THREE	THREE	THREE	THREE	TX EE	THREE	THREE
Pest ic ides	EPA 3550/8080 (9)	6/6n	MDL (2)						!	9	9
A 1 4 1 1 1		0/00	0,002		9	9	£	Ş	9	2	9
	CO 0808/03080 (0)	0/01	0.0008		2	2	2	2	2	2	Q
alpha-BHC		5,6	0.000		2	9	æ	ð	æ	9	2
beta-BHC		n ()	2000.0		2	0,002	2	2	9	2	Q
delta-BHC		5/6n	0,000		2	<u> </u>	9	Ç	9	9	2
L indane	EPA 3550/8080 (9)	6/6n	0.005		⊋ 9	2 9	9 9	9 9	9	9	ON
Chlordane	EPA 3550/8080 (9)	6/6n	0.05		2 6	2 5	2 9	9 9	9 9	9	9
4,4'-000	EPA 3550/8080 (9)	6/6n	0,0004		ເທດ•ິດ	2 8	2 5	9 5	9 5	2	CN
4,4"-DDE		6/6n	0.007		2	70.0	2 9	2 6	2 9	9 9	9
4.4'-DOT	EPA 3550/8080 (9)	6/6n	0.004		90.0	0.04	€ !) oo o	2 9	2 9	2 9
ol relation		b/bn	0,003		2	2	2	2	9	2	Q !
F. 200 500		0/00	0,002		9	2	2	2	2	2	2
		0/011	0.001		2	9	2	2	9	2	0
Endosul ran 11		n (2)	0 0		9	9	Ş	2	0,31	90.0	S
Endosultan Sultate		5 o	0,005		9	2	2	2	ş	웆	ON
Endrin		6/6n	5000		9	S	2	2	2	9	9
Endrin Aldehyde		6/6n	20.0		2 9	2 9	9 9	2	9	2	QN
Heptachlor		6/6n	0.004		9 9	9 9	2	9	Ş	9	9
Heptachlor Epoxide	EPA 3550/8080 (9)	6/6n	0,002		2	2	€ :	9 9	9 9	9	9
Toxaphene	EPA 3550/8080 (9)	6/6n	0.14		9	2	2	2	₹	2	Ş
•	(0) (000) (111	,	0 0		Ş	9	2	Ş	9	9	2
Arochi or 1016	EPA 3330/8080 (9)	6 /6 6	0 00		£	£	2	2	₽	2	QN
Arochlor 1221		6/60	0,00		9 9	Ş	ĝ	2	2	2	9
Arochlor 1232		6/6n	70.0		2 9	? 2	9 9	2	9	9	ON
Arochlor 1242		6/6n	0.02		2 :	2 9	2 2	9	9	Ş	Ş
Arochior 1248	EPA 3550/8080 (9)	6/6n	0.02		₹	Ž	₹	2 !	9 9	9 9	9 9
A		0/00	0.02		2	2	9	2	Ž	⊋	S S
120 M		0/00	0.02		Ð	2	9	2	<u>-</u>	0.17	0.04
Ardenia 1200		n h)								

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

						GW5-A	GW5-B	GW5-C					
				Detection	Field #:	5-6.5	9.5-11	10-11.5	SS-5A	SS58	SS-5C	SS-50	SS-5E
Par aneter	e ter	Method	Units	Limit	Site :	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE
Pesticides	85	EPA 3550/8080 (9)	6/bn	MDL (2)									
Aldrin	85	EPA 3550/8080 (9)	6/60	0.002		2	2	9	9	9	9	Q	2
alpha-BHC	85	EPA 3550/8080 (9)	6/6n	0,0008		2	2	2	9	2	Ð	9	Q
beta-BHC	3	EPA 3550/8080 (9)	6/6n	0.0002		2	2	9	2	9	2	2	2
delta-BHC	8.	EPA 3550/8080 (9)	6/6n	900000		2	9	9	9	2	Ð	2	Q
Lindane	8	EPA 3550/8080 (9)	6/6n	0,003		Ð	윷	9	ᄝ	9	9	9	2
Chlordane	a	EPA 3550/8080 (9)	6∕6n	0.05		9	2	9	9	2	9	9	Q
4,41-000	85	EPA 3550/8080 (9)	g/gu	0.0004		2	2	9	9	9	2	9	₽
4,4'-00€	EPA	A 3550/8080 (9)	6/60	0.007		2	9	9	9	S	2	2	Ş
4,4'-DOT	85	EPA 3550/8080 (9)	6/6n	0.004		2	0.07	9	2	9	2	0,004	0.07
Di eldr in	EP	EPA 3550/8080 (9)	6/6n	0,003		2	2	9	9	2	9	9	Q
Endosultan i	£	EPA 3550/8080 (9)	6/bn	0,002		2	£	2	9	9	9	2	9
Endosulfan il		EPA 3550/8080 (9)	6/6n	00.001		2	Ð	9	2	9	9	2	QN
Endosultan Sultate		EPA 3550/8080 (9)	6/6n	0.02		Q	9	9	2	2	2	9	2
Endrin	85	EPA 3550/8080 (9)	6/6n	0,005		2	¥	2	9	9	2	2	Q
Endrin Aldehyde		EPA 3550/8080 (9)	6/6n	0.02		2	ş	9	9	2	윤	2	£
Heptachlor	e di	EPA 3550/8080 (9)	6/6n	0.004		9	9	9	9	2	9	9	QN
Heptachlor Epoxide		EPA 3550/8080 (9)	6/6n	0.002		9	Ð	9	₽	9	2	Ş	9
Toxaphene	&	EPA 3550/8080 (9)	6/6n	0.14		9	2	Ð	9	9	9	2	Q
Arochior 1016	_	EPA 3550/8080 (9)	b/bn	0.02		2	9	9	9	9	9	9	9
Arochlor 1221		EPA 3550/8080 (9)	6/6n	0.02		9	9	2	2	2	욧	2	QN
Arochior 1232		EPA 3550/8080 (9)	9/9	0.02		9	₽	2	9	2	9	2	9
Arochlor 1242		EPA 3550/8080 (9)	6/6n	0.02		9	2	9	9	9	2	2	Q
Arochlor 1248		EPA 3550/8080 (9)	6/6n	0.02		9	9	9	9	2	2	2	2
Arochior 1254		EPA 3550/8080 (9)	6/6n	0.02		9	2	9	2	2	9	9	Q
Arochlor 1260		EPA 3550/8080 (9)	6/6n	0,02		2	9	9	9	Q	2	2	2

DATACHEM ANALYTICAL REPORT Duluth IAP ~ Soli Samples

			Detection	Fleid #:	B7-A 0-1.5	B7-A	87-8 0-1.5	87-8 2.5-4	GW7 -A 10-11.5	GW7-B 10-11.5	GW7-C 15-16.5	SS-7A*
Parameter	Method		Limit	Site :	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN
Pest ic ides	EPA 3550/8080 (9)		MDL (2)									
Aldrin	EPA 3550/8080 (9)		0,002		Ð	æ	£	9	윷	2	₽	9
alpha-BHC	EPA 3550/8080 (9)		0,0008		2	9	9	9	9	9	2	Q
beta-BHC	EPA 3550/8080 (9)		0,0002		Q	9	ᄝ	2	₽	9	2	Q 2
delta-BHC	EPA 3550/8080 (9)		900000		ž	2	2	2	2	2	2	QN
Lindane	EPA 3550/8080 (9)		0,005		Ð	9	9	9	윷	9	9	Ð
Chlordane	EPA 3550/8080 (9)		0.05		2	2	9	2	9	2	9	QN
4,4,-000	EPA 3550/8080 (9)		0.0004		Ð	2	2	9	2	9	ð	Ð
4,4'-DDE	EPA 3550/8080 (9)		0.007		2	9	9	9	₹	9	2	QN
4,41-DDT	EPA 3550/8080 (9)		0.004		윷	9	읒	9	9	윷	2	9
Dieldrin	EPA 3550/8080 (9)		0,003		9	2	9	2	9	9	2	ON
Endos ul fan 1	EPA 3550/8080 (9)		0,002		Q	⊋	9	9	⊋	9	Q	9
Endosulfan ii	EPA 3550/8080 (9)		0,001		⊋	2	9	9	9	9	2	QN
Endosulfan Sulfate	EPA 3550/8080 (9)		0.02		₽	9	2	9	Ð	Ð	QN	QN
Endrin	EPA 3550/8080 (9)		0,005		9	9	9	9	2	9	2	QN
Endrin Aidehyde	EPA 3550/8080 (9)		0.02		Q	₽	9	9	9	9	욧	Q
Heptachlor	EPA 3550/8080 (9)		0.004		2	2	2	2	9	2	2	Q
Heptachlor Epoxide	EPA 3550/8080 (9)		0,002		9	9	₹	ջ	₹	Q	9	Q
Toxaphene	EPA 3550/8080 (9)		0.14		9	9	9	9	Ð	2	9	QN
Arochlor 1016	EPA 3550/8080 (9)	9/90	0.02		æ	S	Q	9	9	Ş	ð	9
Arochlor 1221	EPA 3550/8080 (9)		0.02		9	2	9	9	9	9	9	QN
Arochlor 1232	EPA 3550/8080 (9)		0.02		Q	Q	9	2	9	9	9	Ð
Arochlor 1242	EPA 3550/8080 (9)		0.02		2	Ð	2	9	9	9	2	QN
Arochior 1248	EPA 3550/8080 (9)		0,02		æ	ᄝ	⊋	S	9	2	Q	2
Arochior 1254	EPA 3550/8080 (9)		0.02		9	2	9	9	9	9	9	QN
Arochlor 1260	EPA 3550/8080 (9)		0,02		Q	Q	Q	9	2	2	9	Q

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT Duiuth IAP - Soil Samples

					B8~A	B8 -A	B8 -A	88-8	88 - 8	4 88	GW8-A	GW8-B	GW8-C
	, to the state of		Detection	Field #:	0-1.5	2.5-4 E1GHT	5-6.5 FIGHT	0-1.5	2.5-4	5-6.5	5-6.5	10-11.5 FIGHT	10-11.5 FIGHT
In our D.		5	E			5	5	5		5	5		
Pesticides	EPA 3550/8080 (9)	6/6n	MD((2)										
Aldrin	EPA 3550/8080 (9)	6/6n	0,002		2	2	9	2	9	2	2	2	9
alpha-BHC	EPA 3550/8080 (9)	6/6n	0,0008		2	9	9	2	9	2	9	9	QN
beta-BHC	EPA 3550/8080 (9)		0,0002		9	9	2	2	9	₹	2	9	9
delta-BHC	EPA 3550/8080 (9)		900000		2	9	9	윤	9	9	9	2	QN
Lindane	EPA 3550/8080 (9)		0,003		2	9	9	9	2	9	9	9	9
Chlordane	EPA 3550/8080 (9)		0.05		2	2	9	2	2	2	9	2	Q
4,4'-000	EPA 3550/8080 (9)		0.0004		9	2	9	90000	2	2	9	2	9
4,4'-DDE	EPA 3550/8080 (9)		0,007		2	2	9	0.007	2	2	9	2	ON
4 ,4 '-DOT	EPA 3550/8080 (9)		0.004		£	9	9	9	9	2	⊋	2	S
Dieldrin	EPA 3550/8080 (9)	6/6n	0,003		2	9	2	9	9	2	2	2	QN
Endosulfan 1	EPA 3550/8080 (9)		0,002		9	ᄝ	9	물	2	2	9	Ð	9
Endosultan 11	EPA 3550/8080 (9)		0.001		9	2	9	2	9	9	2	9	QN
Endosultan Sultate	EPA 3550/8080 (9)		0,02		2	2	9	g	2	2	9	9	9
Endrin	EPA 3550/8080 (9)		0,005		9	2	9	9	2	2	2	9	9
Endrin Aldehyde	EPA 3550/8080 (9)		0,02		9	2	9	욧	2	2	Z	g	2
Heptachlor	EPA 3550/8080 (9)		0,004		2	9	2	9	9	2	9	2	QN
Heptachlor Epoxide	EPA 3550/8080 (9)		0,002		2	£	읒	읒	9	9	9	9	9
Toxaphene	EPA 3550/8080 (9)		0.14		9	9	2	9	2	9	2	9	QN
Arochlor 1016	EPA 3550/8080 (9)	D/On	0.02		9	QN	2	9	2	9	9	Ð	Q
Arochlor 1221	EPA 3550/8080 (9)		0,02		2	2	2	9	9	9	9	9	Q
Arochlor 1232	EPA 3550/8080 (9)		0.02		9	9	2	2	2	2	9	9	9
Arochlor 1242	EPA 3550/8080 (9)		0,02		2	2	9	9	9	2	2	2	QN
Arochlor 1248	EPA 3550/8080 (9)		0.02		9	S	9	9	9	2	2	9	Ð
Arochior 1254	EPA 3550/8080 (9)		0,02		9	2	Ş	2	€	2	2	Ð	QN
Arochlor 1260	EPA 3550/8080 (9)	6/6n	0.02		2	9	Q	g	ð	9	2	Ð	2

DATACHEM AVALYTICAL REPORT Duluth IAP - Solii Samples

						2
Par ameter	Method	Un I ts	Limit Si	Si te :	EI GHT	EI GHT
Pesticides	EPA 3550/8080 (9)	6/6n	MDL(2)			
Al dr in	EPA 3550/8080 (9)	6/6n	0,002		Q	O _N
a I pha-BHC	EPA 3550/8080 (9)	6/6n	900000		윤	Ş
beta-8HC	EPA 3550/8080 (9)	6/60	0,0002		₹	Q
del ta-BHC	EPA 3550/8080 (9)	6/6n	900000		0.001	Q
Lindane	EPA 3550/8080 (9)	6/6n	0,003		2	QN
Chi ordane	EPA 3550/8080 (9)	6/bn	0.05		€	Ŷ
4,41-500	EPA 3550/8080 (9)	6/6n	0,0004		9	Q
4,41-DOE	EPA 3550/8080 (9)	6/6n	0.007		₽	S
4,4'-00T	EPA 3550/8080 (9)	6/6n	0,004		2	Q N
Dieldrin	EPA 3550/8080 (9)	6/6n	0,003		Q	9
Endosulfan 1	EPA 3550/8080 (9)	6/6n	0,002		2	0.01
Endosulfan 11	EPA 3550/8080 (9)	6/6n	0.001		æ	æ
Endosultan Sultate	EPA 3550/8080 (9)	6/6n	0,02		9	QN
Endrin	EPA 3550/8080 (9)	5/bn	0,005		ð	Ð
Endrin Aldehyde	EPA 3550/8080 (9)	6/6n	0.02		9	ON
Heptachlor	EPA 3550/8080 (9)	6/6n	0.004		9	Q
Heptachlor Epoxide	EPA 3550/8080 (9)	6/6n	0,002		2	QN
Toxaphene	EPA 3550/8080 (9)	6/6n	0.14		Q	QN
Arochlor 1016	EPA 3550/8080 (9)	6/6n	0.02		2	Q
Arochlor 1221	EPA 3550/8080 (9)	6/6n	0,02		2	Ð
Arochlor 1232	EPA 3550/8080 (9)	6/6n	0,02		2	Q
Arochlar 1242	EPA 3550/8080 (9)	6/6n	0.02		æ	2
Arochlor 1248	EPA 3550/8080 (9)	6/6n	0.02		2	QN
Arochi or 1254	EPA 3550/8080 (9)	6/6n	0.02		9	0.52
Arochior 1260	EPA 3550/8080 (9)	5/5n	0,02		ð	Q

^{*} Revised 07/10/87

DATACHBA AVALYT ICAL REPORT Duluth IAP - So II Samples

Parameter	Mathod	Sh I ts	Detection Limit	Field #: Site :	B1-A 0-1.5 ONE	81-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-18 ONE
Herbicides	EPA 8150# (9)	g/gn	MDL (2)									
2.4-5	EPA 8150* (9)	6/6m	0.10		웃	Ð		Ş	9	Ð	Q	⊋
0-+°7	EPA 8150* (9)	6/6n	0.02		2	2		2	9	9	2	QN
SI Ver	EPA 8150* (9)	6/bn	0,20		Ð	Q		Q	Q	9	Q	9
Moisture	EPA 160,3 (6)	w	<i>-</i>		12.	40.		:	10.	o [*]	44.	.61
011 & Greese	EPA 413,2 (7)	6/6n	5.		989	190		9	2	7.	870	67.
Phenolics	EPA 420.2 (7)	6/6n	0.4		2	2		9	9	9	9	Q
Arsenic	EPA 3050/7060 (7	6/6n (- •		<u>:</u>	.91		17.	13.	జ	21.	18.
Barium	EPA 200.7 (7)	6/6n	20.		46.	120		64.	31.	24.	80.	37.
Cadm Fum	EPA 200,7 (7) ug/g	6/6n	. •		S.	ð		Q	9	Q	1.8	Q
Chrom Lun	EPA 200.7 (7)	6/6n	5.		13.	28.		21.	.	16.	21.	:
Lead	EPA 200 _• 7 (7)	6/6n	2.		ð	200		9	2	Q	70.	9
Mercury	EPA 7471 (7)	6/6n	0.1		5	Ð		9	Ð	Ð	9	QN
Selentum	EPA 3050/7740 (7)	6/6n (0.1		ð	Q		Q	Q	ND(16)	Ð	Q
Silver	EPA 200.7 (7)	6/6n	:		9	g		9	9	9	9	QN

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT Duluth IAP - Soll Samples

			00+00+00	1013	B3-A	83-A	B3-A	83-8 0-1 5	83-8 2.5-4	83-8 5-6 5	83-C	83-C	83-C
Parameter	Me thod	th Its	Limit	Site :	THREE	THREE	THREE	THREE	THREE	THREE	THREE	T-REE	THREE
Herbicides	EPA 8150* (9)	6/ 6 n	MDL(2)		Ş	Ş	ğ	Ş	ç	9	Ç	9	9
1-6,56	EPA 8150* (9)	6/6n	0.10		⊋ !	⊋ :	⊋ 9	⊋ :	⊋ :	⊋ 9	⊋ :	⊋ 9	⊋ ;
2,4−0	EPA 8150* (9)	6/6n	0.02		9	9	2	2	2	2	9	2	2
S11 vex	EPA 8150* (9)	6/bn	0.20		Q.	Q.	Ð	ð	9	Q.	Ð	9	Q
Molsture	EPA 160.3 (6)	*	- :		.	10.	.	17.	.61	13.	27.	20.	13.
011 & Grease	EPA 413.2 (7)	6/6n	r,		8800	7200	1600	190	06	20	1100	9	2
Pheno I i cs	EPA 420.2 (7)	6/6n	0.4		9	9	2	9	2	9	9	9	Q
Arsenic	EPA 3050/7060 (7) ug/g	6/6n (/	:		2	Q	ND (12)	Q.	오	ᄝ	Q	9	9
Barium	EPA 200.7 (7)	6/6n	20.		39.	45.	45.	54.	49.	34.	48.	39.	29.
Cadmium	EPA 200,7 (7)	6/6n	-		Q	QN	S	Q	2	g	2.	9	- Q
Chromium	EPA 200.7 (7)	6/6n	5.		22.	20.	20.	20.	25.	26.	17.	23.	15.
Lead	EPA 200.7 (7)	6/6n	2.		æ	Q	2	Q	9	9	17.	9	9
Mercury	EPA 7471 (7)	6/6n	0.1		9	2	2	9	Q	9	2	2	QN
Selenium	EPA 3050/7740 (7) ug/g	6/6n (/	0.1		9	2	ND (16)	9	9	9	2	Q	Ð
Sliver	EPA 200.7 (7)	6/6n	. D		2	2	2	9	9	9	9	9	QN

[#] Revised 07/10/87

DATACHEM ANALYTICAL REPORT Dujuth IAP - Solt Samples

					80-3	GW3-A	GW3-8	GW3-0			
Parameter	Me thod	en t	Detection Limit	Field #: Site :	5-6.5 THREE	5-6.5 THREE	5-6.5 THREE	5-6.5 THREE	SS-3A THREE	SS=38 THREE	SS-3C THREE
Herbic ides	EPA 8150* (9)	6/6n	MDL(2)								
2,4,5-T	EPA 8150# (9)	6/60	0.10		Ð	윷	9	9	2	욧	ð
2,4-0	EPA 8150* (9)	6/6n	0.02		2	2	2	2	9	9	Q
Silvex	EPA 8150* (9)	6/6n	0.20		QN	Q	9	Q	9	Ş	<u>Q</u>
Moisture	EPA 160.3 (6)	*	-•		16.	4.	30.	48.	68.	24.	18.
Oil & Grease	EPA 413,2 (7)	6/5n	5.		220	Ð	•06	1700	1200	270	30.
Phenolics	EPA 420.2 (7)	6/6n	0.4		2	9	2	9	S	9	Ş
Arsenic	EPA 3050/7060 (7)	6/6m (. •		NO (15)	ND (12)	ND (15)	ND (15)	.61	14.	.91
Bar lum	EPA 200.7 (7)	6/6n	20.		44.	35.	50.	65.	001	51.	37.
Cadin I un	EPA 200.7 (7)	6/6n			9	Q	Q	9	7.	3,	:
Chromium	EPA 200.7 (7)	6/6n	2°		19.	24.	17.	20.	25.	20.	.91
7997	EPA 200,7 (7)	6/bn	2.		9	Q	Ş	Ş	77.	5.7	Ð
Mercury	EPA 7471 (7)	6/6n	0.1		2	9	2	2	1.0	9	Q
Selentum	EPA 3050/7740 (7)	6/6n (0.1		ND (5)	ND (16)	ND (5)	ND (5)	9	9	9
Silver	EPA 200.7 (7)	6/6n	<u>.</u> :		2	ð	9	9	9	9	Q

* Revised 07/10/87

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intermediate the leter not settle

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

ć	:		Detection	Field #:	GW-5A 5-6.5	GW-58 9.5-11	GW-5C 10-1 1.5	SS-5A	SS-58	25-50	55-50	SS-5E
Parameter	Wethod	un i ts	Limit	Si te :	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE
Herbicides	EPA 8150# (9)	6/6n	MDL(2)								}	
2,4,5-1	EPA 8150# (9)	6/6n	0.10		3	2	9	2	Ž	Ş	Ş	Ş
2,4-0	EPA 8150* (9)	6/6n	0.02		3	Ş	5	æ) <u>Ş</u>	9	2 2	2 3
Silvex	EPA 8150* (9)	6/bn	0.20		2	Q	9	9	9	2 2	9 9	}
Moisture	EPA 160.3 (6)	w	~		12.	7.	15.	18.	23.	35.	26.	25.
Oil & Grease	EPA 413.2 (7)	6/6n	S.		2	49.	45.	87.	6	170	48.	.11.
Phenol ics	EPA 420,2 (7)	6/6n	0.4		2	2	9	9	2	9	9	QN
Arsenic	EPA 3050/7060 (7)				12.	AD (14)	8.	ND (14)	ND (14)	6	6	8
Barlum	EPA 200,7 (7)	6/6n	20.		80.	26.	47.	320	41.	53.	42.	42.
Cadmium	EPA 200,7 (7)	6/6n	. :		N	Ş	9	1.4	9	Q	9	9
Chromitum	EPA 200.7 (7)	6/6n	5.		33.	21.	31.	39.	21.	30.	25.	26.
Lead	EPA 200,7 (7)	6/bn	2.		Q	9	2	9	9	9	9	Q
Mercury	EPA 7471 (7)	6/6n	0.1		Ð	9	9	9	9	9	9	ON
Selenium	EPA 3050/7740 (7)		0.1		ND (16)	Q	9	9	Q	9	9	Q
Silver	EPA 200.7 (7)	6/6n	- •		9	9	9	9	Ş	9	9	Q

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DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Semples

Par anoter	He thod	th its	Detection Limit	Fleid #: Site :	B7-A 0-1.5 SEVEN	87-A 2.5-4 SEVEN	87-8 0-1.5 SEVEN	87-8 2.5-4 SEVEN	GW7 -A 10-11.5 SEVEN		_	SS-7A*
2,4,5-T 2,4-D 2,4-D SII vex	EPA 8150* (9) ug/g EPA 8150* (9) ug/g EPA 8150* (9) ug/g	6/6n 6/6n 6/6n 6/6n	MDL(2) 0,10 0,02 0,20		999	9 9 9	2 2 2	2 2 2	9 9 9	2 2 2	<u> </u>	2 2 2
Moisture	EPA 160.3 (6)	*	. •		45,	23.	34.	17.	•			•16
011 & Grease	EPA 413.2 (7)	6/ôn	5.		20°	9	9	Q	63.			620
Pheno! Ics	EPA 420.2 (7)	6/6n	0.4		9	9	2	2	9			Q
Arsen ic	EPA 3050/7060 (6/Bn (1	- •		S	2	2	9	.			ND (15)
Berium	EPA 200.7 (7)	6/6n	20.		61.	56.	380	80°	33.			23.
Cedmlum	EPA 200.7 (7)	6/ 6 n	. :		Ş	ð	Ð	9	Q			Q.
Circon Lun	EPA 200.7 (7)	6/6n	5.		18.	34.	25.	21.	20.			9
ופאן	EPA 200.7 (7)	6/6n	2.		Ê	9	S	S	9			8 9
Mercury	EPA 7471 (7)	6/6n	1.0		Z	9	9	9	9			0.2
Seienium	EPA 3050/7740 (9/6n (L	0.3		Q X	(S) QN	Q	Q	(16)		Q	ND (5)
Silver	EPA 200.7 (7) ug/g	6/6n	٠		2	2	2	2	2			S

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DATACHEM AMALYFICAL REPORT Duluth IAP - Soil Samples

Parameter Herbicides	Method EPA 8150* (9)	Units ug/a	Detection Limit MDL(2)	Field #: Site :	138-A 0-1.5 EIGHT	88-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	88-8 0-1.5 E.IGHT	2.5-4 EIGHT	88-8 5-6.5 E1041	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GMB-C 10-11.5 E1GHT
2,4,5-T 2,4-D SII vex	EPA 8150* (9) EPA 8150* (9) EPA 8150* (9)	6/6n 6/6n	9 0.10 9 0.02 9 0.20		2 2 2	9 9 9	ON ON ON	S S S			9 9 9	999	3 5 5
Moisture	EPA 160,3 (6)	w	- :		15.	12.	14.	15.			22.	<u>.</u> 5	. 6
Oli & Greese	EPA 413.2 (7)	6/ 6n	5.		300	Q.	Q	80.			Ş	2	160
Phenolics	EPA 420.2 (7)	6/6n	0.4		Ş	9	9	9			9	9	Ð
Arsenic	EPA 3050/7060 (7) ug/g	6/6n (- *	2	(15)	Q	Q	Q			Q	2	Q
Barlum	EPA 200.7 (7)	6/6n	20.		170	64.	73.	41.			55.	29.	57.
Cad m i um	EPA 200.7 (7)	6/6n	~		S	Q	QN	æ			9	Ð	9
Chromium	EPA 200.7 (7)	6/6n	5.		18.	31.	34.	17.			26.	12.	25.
pee1	EPA 200.7 (7)	6/6n	2.		æ	Q	2	15.			S	æ	9
Mercury	EPA 7471 (7)	6/6n	0.1		2	2	9	2			9	9	Q
Selenium	EPA 3050/7740 (7) ug/g	6/6n	0.1	Z	(16)	Q	Q	Š			Q	Q	Q
Silver	EPA 200.7 (7)	6/6n	 •		ð	Ð	Ş	9			9	9	QN

* Rev I sed 07/10/87

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

			Detection	Field #:	SS-8A*	SS-8B*	
Par aneter	Met hod	Units	Limit	Site :	E1 GHT	EGE	
Herbicides	EPA 8150* (9)	6/6n	MDL(2)		Ş	2	
2.4.5-1	EPA 8150# (9)	6/6n	0.10		2	Q ·	
2 4-D	EPA 8150* (9)	b/bn	0.02		2	2	
Silver	EPA 8150# (9)	6/6n	0.20		9	ON	
Moisture	EPA 160.3 (6)	w	. •		33.	.11.	
OII & Grease	EPA 413.2 (7)	6/6n	5.		70.	730	
Phenolics	EPA 420.2 (7)	6/6n	0.4		9	9	
Arsenic	EPA 3050/7060 (7) ug/g	6/6n (- •		(51) UN	QN	
Barlum	EPA 200 _a 7 (7)	6/6n	20°		47.	24.	
Cadm lum	EPA 200 ₆ 7 (7)	6/6n	. •		2	QN	
Chrom tum	EPA 200.7 (7)	6/6n	5.		18.	=	
Lead	EPA 200.7 (7)	6/6n	2.		2	43.	
Mercury	EPA 7471 (7)	6/6n	0.1		Q	웊	
Selen lun	EPA 3050/7740 (7) ug/g	g/gn (1	0.1		ND (5)	Q	
Silver	EPA 200,7 (7)	6/6n	:		<u>Q</u>	QN	

* Revised 07/10/87

DATACHEM AVALYTICAL REPORT Duluth IAP - Soil Samples

Parameter	Me thod	Un its	Detection Limit	Fleid #: Site ::	B2-B 0-1.5 TW0	82-8 2.5-4 TWO	82-8 5-6.5 TWO	82-C 0-1.5 TWO	82-C 2.5-4 TWO	82-C 5-6.5 TWO	5-6.5 TWO	GW2-8 5-6.5 TW0	GW2-C 15-16.5 TWO
Moisture	EPA 160.3 (6)	×	<u>.</u>		17.	14.	13.	&	•9	10.	13.	15.	14.
Oil & Grease	EPA 413.2 (7) ug/g	6/60	5.		Ð	2	21.	94 00	2000	1700	•9	410	••
Phenolics	EPA 420,2 (7) ug/g	6/6n	0.4		9	6.0	5*5	9.0	9	2	30.	2	•06

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

Parameter	M e thod	ا 1+	Detection Limit	Field #: Site :	GW2-D 15-16.5 TWO	GW2-E 15-16.5 TWO	SS-2A TWO	SS-2B TWO	SS-2C TWO	84-A 2.5-4 FOUR	84-A 5-6.5 FOUR	B4-A 7.5-9 FOUR	84-8 2.5-4 Four
Noisture	EPA 160.3 (6)	~	-			=	53.	28.	45.	74.	75.	64.	74.
Oil & Grease	EPA 413,2 (7) ug/g	6/bn	5.		46.	7.	1200	220	260	1700	510	300	1700
Phenolics	EPA 420,2 (7)	6/6n	0.4		Q	9	9	9	9				

Parameter	Method	ا ا ا	Detection Limit	Field #: Site :	5-6.5 FOUR	B4-B 7.5-11.5 FOUR	2.5.4 FOUR	5-6.5 FOUR	84-C 7,5-9 FOUR	84-0 2.5-4 FOUR	84-0 5-6.5 FOUR	84-0 7,5-9 FOUR	84-E 2.5-4 FOUR
Moisture	EPA 160.3 (6)	w	<u>.</u> :		57.	13.	37.	17.	22.	<u>.</u>	20.	18.	15.
Oil & Grease	EPA 413,2 (7) ug/g	6/6n	5.		580	24.	340	40.	Q	•06	430	•06	9

DATACHEM MALYTICAL REPORT Duluth IAP - Soil Samples

Parameter	Me thod	Un 1†s	Detection Limit	Fleid#: Site :	5-6.5 FOUR	SS-4A FOUR	SS-4B FOUR	SS-4C FOUR	SS-4D FOUR	GW4-A* 10-11.5* FOUR *	GW4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-D 5-6.5 FOUR
Hoisture	EPA 160,3 (6)	×	-:		12.	•09	57.	15.	62.	12.*	44.	27.	73.
Oil & Greese	EPA 413,2 (7) ug/g	6/6n	5,		9	480	10000	2400	096	580*	130	07	%

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples

					B6-A	96−A	B - 9	B6 -B
			Detection	Fleld #:	0-1-5	2.5-4	0-1-5	2.5-4
Parameter	Method	Units	Lim i +	Site :	SIX	SIX	SIX	SIX
Moisture	EPA 160.3 (6)	w	.		22.	.61	.61	.61
Oil & Grease	EPA 413.2 (7)	6/6n	5.		9	Q	810	9
Ethylane Glycol	NIOSH P&CAM 338 (8) ug/g	6/6n	6*0		9	Ð	9	Q

DATACHEM MMALYTICAL REPORT Duluth IAP - Soil Samples

			Detection	Find #	Orum 421	Orum	0-2.5	0-2.5	Drum
Parameter	Method	Un its	Limit	Site :	TWO	THREE	four	£ 59 EI GHT	GWB-C EIGHT
Ignitability	EPA 1010 (9)	≨	× > N		z	z	z	z	z
Arsen lc	EPA 1310/7060 (9)	mg/L	0.01		Q	Q	9	Q	ND (15)
Berlum	EPA 1310/7080 (9)	mg/L	0.1		0.1	2	0.1	0.1	Q
Cadmium	EPA 1310/7130 (9)	1/6m	0.01		9	9	9	S	⊋
Chromium	EPA 1310/7190 (9)	mg/L	90°0		9	Z	2	9	Q
Lead	EPA 1310/7421 (9)	mg/L	0.05		Q	Q	9	Q	9
Mercury	EPA 1310/7470 (9)	mg/L	0,001		9	9	2	9	9
Selenium	EPA 1310/7740 (9)	mg/L	0.01		Q	Ð	9	웊	ND (15)
Silver	EPA 1310/7760 (9)	mg/L	0.01		2	2	9	Ş	S

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UBIL ANALYTICAL REPORT Duluth IAP - Water Samples

			Detection	Field #:	GW1-A	GW1-C	GW1-D	GW1-E	SW-1A	SW-1B	GW2-A	GW2-8	GW2-C
Parameter	Method	Units	Limit	Site :	CNE	ONE	ONE	ONE	ONE	ONE	TWO	OM I	DMO
Purgeable Halocarbons	EPA 601 (1)	√L Mg/L	MDL (2)										
Ch I or one than	EPA 601 (1)	J/gn	0.49		2	9	Q	9	9	9	2	2	2
Methylene Chloride	EPA 601 (1)	ng/L	0,34		9	2	9	9	2	2	9	2	QN
Carbon Tetrachloride	EPA 601 (1)	ug/r	0.46		9	9	2	9	9	윷	2	9	2
Bromodichloramethane	EPA 601 (1)	ng/L	0,35		9	9	2	9	2	9	9	9	ON
Dibromoch! oromethane	EPA 601 (1)	J/gn	0,31		2	9	9	Ð	2	9	2	Ð	9
Bromane than e	EPA 601 (1)	ng/L	0.63		9	웆	9	2	9	2	¥	9	Q
Dichi orodifiuoromethane	EPA 601 (1)	ng/L	0.33		9	Q	9	9	9	9	9	2	Q
Trichlorofluoromethane	EPA 601 (1)	√lon	0.44		9	9	9	9	9	9	9	2	Q
Chloroform	EPA 601 (1)	ug/L	0.45		9	2	9	9	Q	9	2	9	2
Bromoform	EPA 601 (1)	ng/L	0.45		2	9	2	9	9	9	9	9	QN
Chloroethane	EPA 601 (1)	ng/L	0.38		ᄝ	9	2	9	9	9	2	2	9
1,1-Dichioroethane	EPA 601 (1)	√L ng/L	0,49		9	2	9	2	2	9	9	9	QN
1,2-Dichloroethane	EPA 601 (1)	ng/r	0.44		9	9	9	9	⊋	2	9	9	Q
1,1,1-Trichloroethane	EPA 601 (1)	ng/L	0,53		9	9	9	9	9	5.9	2	2	9
1,1,2-Tr ich! oroethane	EPA 601 (1)	J/gn	0.51		Ð	9	Q	9	Q	9	2	9	9
1,1,2,2-Tetrachioroethane	EPA 601 (1)	ng/L	0,38		9	2	2	9	9	9	2	9	QN
Vinyl Chloride	EPA 601 (1)	J/gu	0.54		9	9	Ş	오	9	9	2	9	Q
1,1-Dichtoroethene	EPA 601 (1)	ng/L	0.49		2	9	9	2	9	9	9	2	ON
trans-1,2-Dichloroethene	EPA 601 (1)	ug/L	0.42		9	9	Q	Q	9	2	9	2	Q
Trichloroethene	EPA 601 (1)	ng∕L	09*0		2	9	2	2	9	2	2	2	Q
Tetrachi oroethene	EPA 601 (1)	ng/L	0,38		9	9	윤	9	9	2	윷	9	Q
1,2-Dichloropropane	EPA 601 (1)	ng/L	0,20		9	2	2	2	2	2	9	2	QN
cls-1,3-Dichloropropene	EPA 601 (1)	ng/L	0.58		9	9	S	Q	윷	£	2	9	9
trans-1,3-Dichloropropene	EPA 601 (1)	ng/L	0,39		2	9	9	2	£	9	9	2	QN
2-Chloroethylvinyl Ether	EPA 601 (1)	ug/L	0.44		Q	ᄝ	9	Ş	Q	9	9	2	Q
Chlorobenzene	EPA 601 (1)	J/gn	0,37		2	9	9	2	9	2	9	9	QN
1,2-Dichlorobenzene	EPA 601 (1)	ug/L	0.29		9	Ð	9	ᄝ	ᄝ	9	9	£	9
1,3-Dichlorobenzene	EPA 601 (1)	ng/L	0.42		2	2	9	2	2	9	2	2	QN
1,4-Dichlorobenzene	EPA 601 (1)	J/ĝn	/L 0.41		2	Q	9	₹	2	오	9	9	Q

DATACHEM ANALYTICAL REPORT Duluth IAP - Water Samples

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EPA 601 (1) ug/L 0.49 NO NO NO Ge EPA 601 (1) ug/L 0.49 NO NO NO nee EPA 601 (1) ug/L 0.46 NO NO NO nee EPA 601 (1) ug/L 0.55 NO NO NO thane EPA 601 (1) ug/L 0.44 NO NO NO EPA 601 (1) ug/L 0.45 NO NO NO NO EPA 601 (1) ug/L 0.45 NO NO NO NO EPA 601 (1) ug/L 0.45 NO NO NO NO EPA 601 (1) ug/L 0.45 NO NO NO NO EPA 601 (1) ug/L 0.45 NO NO NO NO ethane EPA 601 (1) ug/L 0.53 NO NO NO ethane EPA 601 (1) ug/L 0.54 NO NO NO <th>Par ameter</th> <th>Method</th> <th>Units</th> <th>Limit</th> <th>Site :</th> <th>ONL ONL</th> <th>T¥O</th> <th>DWL</th> <th>TWO</th> <th>OM OM OM</th> <th>TWO</th> <th>TWO</th> <th>0,40</th> <th>TWO</th>	Par ameter	Method	Units	Limit	Site :	ONL ONL	T¥O	DWL	TWO	OM OM OM	TWO	TWO	0,40	TWO
Properties Pro	Purgeable Halocarbons	EPA 601 (1)		MDL (2)										
lor ide EPA 601 (1) ug/L 0.34 ND ND ND childratide EPA 601 (1) ug/L 0.46 ND ND ND ND childrate EPA 601 (1) ug/L 0.55 ND ND ND ND chromethane EPA 601 (1) ug/L 0.33 ND ND ND chromethane EPA 601 (1) ug/L 0.45 ND ND ND chromethane EPA 601 (1) ug/L 0.45 ND ND ND sthane EPA 601 (1) ug/L 0.45 ND ND ND procession EPA 601 (1) ug/L 0.45 ND ND ND sthane EPA 601 (1) ug/L 0.43 ND ND ND sthane EPA 601 (1) ug/L 0.53 ND ND ND sthane EPA 601 (1) ug/L 0.54 ND ND ND sthane	Chloraethane	EPA 601 (1)		0.49		æ	2	Q	9	9	9	9	윷	9
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concertance EPA 601 (11) ug/L 0,31 ND ND ND borcomerthane EPA 601 (11) ug/L 0,63 ND ND ND ND borcomerthane EPA 601 (11) ug/L 0,44 ND ND ND ND branchane EPA 601 (11) ug/L 0,45 ND ND ND ND branchane EPA 601 (11) ug/L 0,45 ND ND ND ND broco-thane EPA 601 (11) ug/L 0,49 ND ND ND ND broco-thane EPA 601 (11) ug/L 0,51 ND ND ND ND broco-thane EPA 601 (11) ug/L 0,54 ND ND ND ND broco-thane EPA 601 (11) ug/L 0,54 ND ND ND ND broco-thane EPA 601 (11) ug/L 0,54 ND ND ND ND broco-thane EPA 601 (11) ug/L 0,54 ND ND ND ND broco-th	Bromodichioromethane	_		0,35		2	2	2	2	9	2	9	2	QN
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EPA 601 (1) ug/L 0.49 ND ND ND ND EPA 601 (1) ug/L 0.53 ND	Chloroethane			0,38		9	Q	9	9	9	9	£	2	ş
EPA 601 (1) ug/L 0.44 ND ND ND ND EPA 601 (1) ug/L 0.53 ND	1,1-Dichloroethane			0,49		2	9	9	2	9	9	2	2	Q
EPA 601 (1) ug/L 0.53 ND ND ND 106 EPA 601 (1) ug/L 0.51 ND ND ND ND EPA 601 (1) ug/L 0.54 ND ND ND ND EPA 601 (1) ug/L 0.49 ND ND ND ND EPA 601 (1) ug/L 0.42 ND ND ND ND EPA 601 (1) ug/L 0.58 ND ND ND ND EPA 601 (1) ug/L 0.58 ND ND ND ND EPA 601 (1) ug/L 0.58 ND ND ND ND EPA 601 (1) ug/L 0.39 ND ND ND ND EPA 601 (1) ug/L 0.37 ND ND ND ND EPA 601 (1) ug/L 0.42 ND ND ND ND EPA 601 (1) ug/L 0.42 ND ND ND <	1,2-Dichloroethane	601	ng/L	0.44		9	윷	9	2	9	9	9	9	2
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EPA 601 (1) ug/L 0.38 ND ND ND EPA 601 (1) ug/L 0.54 ND ND ND ND EPA 601 (1) ug/L 0.42 ND ND ND ND EPA 601 (1) ug/L 0.60 ND ND ND ND EPA 601 (1) ug/L 0.20 ND ND ND ND EPA 601 (1) ug/L 0.58 ND ND ND ND EPA 601 (1) ug/L 0.39 ND ND ND ND EPA 601 (1) ug/L 0.37 ND ND ND ND EPA 601 (1) ug/L 0.37 ND ND ND ND EPA 601 (1) ug/L 0.42 ND ND ND ND EPA 601 (1) ug/L 0.42 ND ND ND ND EPA 601 (1) ug/L 0.42 ND ND ND ND <t< th=""><th>1,1,2-Trichloroethane</th><th>109</th><th>ug/L</th><th>0.51</th><th></th><th>2</th><th>₽</th><th>9</th><th>9</th><th>9</th><th>2</th><th>9</th><th>2</th><th>2</th></t<>	1,1,2-Trichloroethane	109	ug/L	0.51		2	₽	9	9	9	2	9	2	2
EPA 601 (1) ug/L 0,54 ND ND ND ND EPA 601 (1) ug/L 0,49 ND ND ND ND ND EPA 601 (1) ug/L 0,49 ND ND ND ND EPA 601 (1) ug/L 0,20 ND ND ND ND ND EPA 601 (1) ug/L 0,58 ND	1, 1, 2, 2-Te trachloroethane			0.38		9	2	9	2	9	2	2	2	Q
EPA 601 (1) ug/L 0.49 ND ND ND B EPA 601 (1) ug/L 0.42 13. 66. ND EPA 601 (1) ug/L 0.50 ND 20. ND EPA 601 (1) ug/L 0.58 ND ND ND 10 EPA 601 (1) ug/L 0.59 ND ND ND 10 EPA 601 (1) ug/L 0.39 ND ND ND 10 EPA 601 (1) ug/L 0.37 ND ND ND EPA 601 (1) ug/L 0.37 ND ND ND ND EPA 601 (1) ug/L 0.42 ND ND ND ND EPA 601 (1) ug/L 0.42 ND ND ND ND	Vinyl Chloride	601	7/6n	0.54		2	2	2	윷	윷	2	2	Ð	9
EPA 601 (1) ug/L 0.42 13. 66. ND EPA 601 (1) ug/L 0.60 ND 20. ND EPA 601 (1) ug/L 0.38 ND ND ND EPA 601 (1) ug/L 0.58 ND ND ND EPA 601 (1) ug/L 0.39 ND ND ND ND F EPA 601 (1) ug/L 0.39 ND ND ND ND EPA 601 (1) ug/L 0.37 ND ND ND ND EPA 601 (1) ug/L 0.37 ND ND ND EPA 601 (1) ug/L 0.39 ND ND ND EPA 601 (1) ug/L 0.39 ND ND ND EPA 601 (1) ug/L 0.39 ND ND ND EPA 601 (1) ug/L 0.44 ND ND ND EPA 601 (1) ug/L 0.42 ND ND ND EPA 601 (1) ug/L 0.44 ND ND ND EPA 601 (1) ug/L 0.45 ND ND ND ND EPA 601 (1) ug/L 0.45 ND	1,1-Dichloroethene	109	ng/L	0.49		2	2	2	2	9	9	2	2	Q
EPA 601 (1) ug/L 0,60 ND 20, ND EPA 601 (1) ug/L 0,38 ND ND ND ND EPA 601 (1) ug/L 0,58 ND ND ND ND EPA 601 (1) ug/L 0,58 ND ND ND ND r EPA 601 (1) ug/L 0,44 ND ND ND ND EPA 601 (1) ug/L 0,37 ND ND ND EPA 601 (1) ug/L 0,37 ND ND ND ND EPA 601 (1) ug/L 0,37 ND ND ND EPA 601 (1) ug/L 0,42 ND ND ND ND EPA 601 (1) ug/L 0,42 ND ND ND ND EPA 601 (1) ug/L 0,44 ND ND ND ND	trans-1,2-Dichloroethene	109	J/gu	0.42		13.	•99	Q	9	2.6	2,3	2	2	2
EPA 601 (1) ug/L 0,38 ND ND ND ND ND EPA 601 (1) ug/L 0,20 ND ND ND ND ND ND EPA 601 (1) ug/L 0,58 ND	Trichloroethene	109		09*0		2	20.	2	2	2	9	9	2	Q
EPA 601 (1) ug/L 0,20 ND ND ND ND SEPA 601 (1) ug/L 0,58 ND	Tetrachloroethene	109		0,38		9	₽	2	읒	9	2	2	Q	9
EPA 601 (1) ug/L 0,58 ND	1,2-Dichloropropane	2		0,20		2	9	9	9	2	2	2	2	Q
All properties EPA 601 (1) ug/L 0,39 ND ND ND Vinyl Ether EPA 601 (1) ug/L 0,44 ND ND ND enzene EPA 601 (1) ug/L 0,29 ND ND ND enzene EPA 601 (1) ug/L 0,29 ND ND ND enzene EPA 601 (1) ug/L 0,42 ND ND ND	c's-1,3-0ichloropropene	109		0.58		2	윷	S	욮	욮	웆	身	ᄝ	ᄝ
vinyl Ether EPA 601 (1) ug/L 0.44 ND ND ND enzene EPA 601 (1) ug/L 0.29 ND ND ND enzene EPA 601 (1) ug/L 0.42 ND ND ND enzene EPA 601 (1) ug/L 0.42 ND ND ND	trans-1,3-Dichloropropene			0, 39		9	9	2	9	9	2	2	2	QN
EPA 601 (1) ug/L 0,37 ND ND ND enzene EPA 601 (1) ug/L 0,29 ND ND ND enzene EPA 601 (1) ug/L 0,42 ND ND ND enzene EPA 601 (1) ug/L 0,42 ND ND ND	2-Chi oroethylvinyl Ether	601		0.44		Q	Q	S	Q	Ð	9	2	2	2
EPA 601 (1) ug/L 0,29 ND ND ND EPA 601 (1) ug/L 0,42 ND ND ND ND EPA 601 (1) ug/L 0,42 ND	Chlorobenzene			0,37		2	9	2	2	9	2	2	2	Q
EPA 601 (1) ug/L 0.42 ND ND ND EPA 601 (1) ug/L 0.41 ND ND ND ND	1,2-Dichlorobenzene	109		0.29		9	9	9	2	2	9	2	물	Ð
ON ON ON ON ON	1,3-Dichlorobenzene	_		0.42		9	2	2	2	2	2	2	2	9
	1,4-Dichlorobenzene	EPA 601 (1)		0.41		9	9	9	Q	2	9	9	9	9

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			Detection	Field #:	9-MM	MW-7	GW3-A	GW3-B	GW3-C	GW3-D	SW-3A	SW-38	SW-3C
Parameter	Method	un i ts	Limit	Site :	OMI	OWL	THREE	THREE	THREE	THREE	THREE	THREE	THREE
Purgeable Halocarbons	EPA 601 (1)	J/gu	MDL (2)										
Chł oramethane	EPA 601 (1)	J/En	0.49		9	9	2	2	2	Ð	2	9	9
Methylene Chloride	EPA 601 (1)	ug/L	0,34		2	4.4	2	2	2	9	2	9	QN
Carbon Tetrachloride	EPA 601 (1)	ug/L	0.46		9	9	9	9	9	2	9	2	Q
Bromodichioromethane	EPA 601 (1)	ng/L	0,35		2	9	9	2	9	2	0.87	9	Q
Dibromochi orome thane	EPA 601 (1)	ng/L	0,31		9	9	ᄝ	9	9	0.	Ð	9	9
Bromomethane	EPA 601 (1)	ng/L	0,63		2	9	9	2	2	2	2	2	Q
Dichlorodifluoromethane	EPA 601 (1)		0,33		2	Ð	2	9	₹	Ð	ð	9	Ð
Trichlorofluoromethane	EPA 601 (1)		0.44		2	0.88	2	2	2	9	2	2	Q
Chloroform	EPA 601 (1)		0.45		Ş	9	₹	3.6	9	2,3	g	1.6	1.4
Bromoform	EPA 601 (1)	ng/L	0.45		9	9	9	9	2	9	2	9	₹
Chloroethane	EPA 601 (1)		0,38		2	⊋	ᄝ	Q	2	0.10	₹	9	9
1,1-Dichloroethane	EPA 601 (1)		0.49		9	9	2	310	83.	97.	6.8	36.	37.
1,2-Dichloroethane	EPA 601 (1)		0.44		2	9	9	4.7	ð	6•1	9	3.0	2.8
1,1,1-Trichiorsethane	EPA 601 (1)		0,53		9	9	2	1900	83.	1400	25.	1400	970
1,1,2-Trichloroethane	EPA 601 (1)		0.51		Ş	Q	9	9	9	9	2	ջ	₽
1,1,2,2-Tetrachloroethane	EPA 601 (1)		0,38		2	2	2	9	2	9	9	9	Q
Vinyl Chloride	EPA 601 (1)		0,54		9	9	9	Q	9	9.1	0.9	4.8	3.0
1,1-Dichloroethene	EPA 601 (1)		0.49		9	9	2	30.	69.0	47.	2.1	35.	26.
trans-1,2-Dichloroethene	EPA 601 (1)		0.42		9	Q	9	35.	260	. 89	82.	70.	55.
Trichloroethene	EPA 601 (1)		09*0		2	9	9	4.4	31.	4.4	740	970	350
Tetrach loroethene	EPA 601 (1)		0,38		₽	9	9	490	430	1000	10.	10.	8.1
1,2-Dichloropropane	EPA 601 (1)	ug/L	0.20		9	9	9	2	2	9	2	2	2
cis-1,3-Dichloropropene	EPA 601 (1)		0.58		Q	Q	9	S	9	윤	2	웃	₽
trans-1,3-Dichloropropene	EPA 601 (1)	ug/L	0,39		Ð	2	9	9	2	2	2	2	Q
2-Chloroethylvinyl Ether	EPA 601 (1)		0.44		Ð	9	9	9	₽	ᄝ	9	2	Q
Chiorobenzene	EPA 601 (1)	ug/L	0,37		2	2	9	2	2	2	2	2	QN
1,2-Dichlorobenzene	EPA 601 (1)	ug/r	0.29		₽	욮	9	9	₽	2	2	9	9
1,3-Dichlorobenzene	EPA 601 (1)	√Sn	0.42		2	2	2	2	2	9	2	2	Q
1,4-Dichiorobenzene	EPA 601 (1)	ng/r	0.41		9	9	9	9	Q	2	9	9	9

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			Detection	Field#:	GW4-A	GW4-B	GN4-C	GW4 -D	SW-4A	SW-48	SE 4.	SW-4D	MM-8
Par aneter	Method	Units	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgeable Helocarbons	EPA 601 (1)	ug/L	MOL (2)										
Chi orome thane	EPA 601 (1)	ng/L	65.0		9	Q	2	¥	9	9	웃	9	Ş
Methylene Chloride	EPA 601 (1)	ŋ∕k	0,34		2	2	2	2	2.1	2,3	2.8	3.5	Q
Carbon Tetrachloride	EPA 601 (1)	J/gn	0,46		9	9	2	9	2	2	2	9	9
Bromodichloromethane	EPA 601 (1)	ng/r	0,35		2	2	9	2	2	9	2	9	Q
Dibramochloramethane	EPA 601 (1)		0.31		Q	Q	₽	2	용	2	9	9	2
Bromomethane	EPA 601 (1)	√gn	0,63		9	9	2	9	9	2	2	2	QN
Dichlorodifluoromethane	EPA 601 (1)		0,33		2	9	2	9	9	9	9	9	2
Trichlorofiuoromethane	EPA 601 (1)		0.44		2	9	2	2	윤	9	2	2	5.5
Chioroform	EPA 601 (1)		0.45		9	æ	æ	Ş	2	2	2	웆	2
Bromoform	EPA 601 (1)	ng/L	0.45		2	9	9	9	9	Ð	9	9	QN
Chloroethane	EPA 601 (1)		0,38		Ð	9	9	2	9	9	2	2	Ş
1, 1-Dichloroethane	EPA 601 (1)		0.49		9	2	2	2	9	2	2	2	Q
1,2-Dichloroethane	EPA 601 (1)		0.44		9	9	9	ᄝ	ş	Ş	Ð	Ð	Ş
1, 1, 1-Tr ichi oroethane	EPA 601 (1)	ug/L	0,53		2	9	2	2	9	9	.61	<u>.</u> 0	9
1,1,2-Trichloroethane	EPA 601 (1)		0.51		æ	9	2	Ş	2	ջ	9	9	웆
1,1,2,2-Tetrachloroethane	EPA 601 (1)		9X °0		9	9	9	2	g	9	2	2	Q
Vinyl Chloride	EPA 601 (1)		0.54		¥	9	2	Ş	9	Q	9	Ð	Q
1,1-Dichloroethene	EPA 601 (1)		0.49		2	2	9	2	2	2	2	2	Q
trans-1,2-Dichloroethene	EPA 601 (1)		0.42		9	9	Q	Ş	9	4.0	4.4	2,2	웆
Tr ichioroethene	EPA 601 (1)		09*0		2	9	9	2	2	22.	16.	9.6	QN
Tetrachi oroethene	EPA 601 (1)		0,38		2	9	윷	2	웆	æ	2	웆	9
1,2-Dichloropropane	EPA 601 (1)		0.20		9	₽	2	9	2	2	2	2	Q
cis-1,3-Dichloropropene	EPA 601 (1)		0.58		Ð	Q	윷	Ş	2	9	9	2	S
trans-1, 3-Dichloropropene	EPA 601 (1)		0,39		Ð	2	2	2	2	2	2	2	Q
2-Chloroethylvinyl Ether	EPA 601 (1)		0.44		2	윷	2	ᄝ	Ð	Q	₽	9	9
Chlorobenzene	EPA 601 (1)		0.37		2	2	2	2	2	96*0	2.2	9	8
1,2-Dichlorobenzene	EPA 601 (1)	J/gn	0,29		Q	9	웆	Ş	9	9	¥	S	æ
1,3-Dichlorobenzene	EPA 601 (1)	ng/L	0.42		9	9	9	9	2	2	2	2	Q
1,4-Dichiorobanzana	EPA 601 (1)		0.41		9	9	9	9	9	9	2	9	2

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Pacement of the continue of the continu				Detection	Field #:	6- MW	M-10	MM-1.1	GW5-A	GW5-B	GW5-C	SW-5A	SW-58	SW-5C
### Ph 601 (1) ug/L 0.45 mt. mt.	Par ameter	Method	Units	Limit	Site :	FOUR	FOUR	FOUR	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE
Cycle EPA 601 (1) ug/L 0.49 n.0	Purgeable Halocarbons	EPA 601 (1)	ug/L	MDL (2)										
of lide EPA 601 (1) ug/L 0.54 NO NO <th>Chioromethane</th> <th></th> <th>ng/r</th> <th>0.49</th> <th></th> <th>QV</th> <th>Ð</th> <th>Ð</th> <th>N</th> <th>Ð</th> <th>9</th> <th>Ð</th> <th>₹</th> <th>Ð</th>	Chioromethane		ng/r	0.49		QV	Ð	Ð	N	Ð	9	Ð	₹	Ð
PM 601 (11) GP/L 601 (Methylene Chioride		ug/L	0.34		2	2	2	2	ð	9	2	9	QN
EA 601 (1) ug/L 0.35 ND	Carbon Tetrachloride	601	ug/L	0.46		9	S	7	2	9	9	2	2	9
EPA 601 (11) gg/L 0,31 ND	Bromodichloromethane	109	ug/L	0,35		9	2	9	9	Q	9	9	9	QN
EA 601 (1) ug/L 0.63 h0 N0	Dibramochloramethane	(09	1/6n	0,31		9	¥	2	2	욧	9	9	9	¥
From than 6 EAA 601 (1) 49/1 0,435 NG	Bromomethane	_	ug/L	0.63		9	9	2	2	2	9	2	9	Q
FPA 601 (11) ug/L 0.44 ub 1,9 ub 1,9 ub	Dich! orod!fluoromethane	109	ng∕L	0,33		9	₹	₽	2	9	9	9	9	2
FPA 601 (11) ug/L 0.45 ND ND ND ND ND ND ND N	Trichiorofiuoromethane	109	ug/L	0.44		2	2	6.1	9	9	2	2	9	皇
FA 601 (1) ug/L 0.45 ND	Chloroform	- 09	ug/L	0.45		Ş	₹	Ð	2	9	9	9	¥	9
EAA 601 (1) ug/L 0.38 ND	Bromoform		ng/r	0.45		Ş	9	9	9	Ş	2	2	2	Q
thane EAA 601 (1) ug/L 0.49 ND	Chloroethane	601	ug/L	0,38		9	Q	£	ᄝ	Q	9	2	2	g
thane EA 601 (1) ug/L 0.44 ND	1,1-Dichloroethane	109	ng/L	0.49		2	9	2	2	2	2	2	2	QN
roothane EPA 601 (1) ug/L 6.53 ND ND </th <th>1,2-Dichloroethane</th> <th>109</th> <th>ug/L</th> <th>0.44</th> <th></th> <th>⊋</th> <th>9</th> <th>2</th> <th>웆</th> <th>¥</th> <th>2</th> <th>9</th> <th>2</th> <th>2</th>	1,2-Dichloroethane	109	ug/L	0.44		⊋	9	2	웆	¥	2	9	2	2
roothane EPA 601 (1) ug/L 0.51 ND ND </th <th>1,1,1-Trichloroethane</th> <th>601</th> <th>ug/L</th> <th>0.53</th> <th></th> <th>9</th> <th>æ</th> <th>9</th> <th>9</th> <th>2</th> <th>9</th> <th>2</th> <th>2</th> <th>Q</th>	1,1,1-Trichloroethane	601	ug/L	0.53		9	æ	9	9	2	9	2	2	Q
chiocoethane EPA 601 (11) ag/L 0.38 ND	1,1,2-Trichioroethane	109	ng/L	0.51		9	9	2	9	2	9	2	9	9
e EPA 601 (1) ug/L 0.54 ND	1,1,2,2-Tetrachloroethane	601	ng∕L	0.38		9	9	2	9	2	9	2	2	Q
thene EPA 601 (1) ug/L 0.49 ND ND ND ND ND ND ND hloroethene EPA 601 (1) ug/L 0.42 ND ND ND ND ND ND ND ND hene EPA 601 (1) ug/L 0.60 ND	Vinyl Chloride	601	ug/L	0.54		9	9	2	2	2	2	2	₽	2
No FPA 601 (1) ug/L 0,42 ND 5,8 ND	1,1-Dichloroethene	109	√Sn	0.49		9	9	2	2	2	2	9	2	Q
ne EPA 601 (1) ug/L 0,60 ND	trans-1,2-Dichloroethene	09	ng/L	0.42		9	5.8	2	Q	£	9	2	2	æ
thene EPA 601 (1) ug/L 0,38 ND	Tr ichi oroethene	109	J∕6n	09.0		⊋	2	9	2	2	2	2	2	Q
ropane EPA 601 (1) ug/L 0,20 ND ND <th>Tetrachloroethene</th> <th>109</th> <th>ug/r</th> <th>0.38</th> <th></th> <th>2</th> <th>9</th> <th>æ</th> <th>⊋</th> <th>9</th> <th>2</th> <th>9</th> <th>9</th> <th>Ş</th>	Tetrachloroethene	109	ug/r	0.38		2	9	æ	⊋	9	2	9	9	Ş
Oropropene EPA 601 (1) ag/L 0,58 ND ND <th< th=""><th>1,2-Dichloropropane</th><th>- 109</th><th>ng/L</th><th>0.20</th><th></th><th>9</th><th>2</th><th>9</th><th>9</th><th>9</th><th>9</th><th>9</th><th>9</th><th>QV</th></th<>	1,2-Dichloropropane	- 109	ng/L	0.20		9	2	9	9	9	9	9	9	QV
bloropropene EPA 601 (1) ug/L 0,39 ND	cis-1,3-Dichioropropene	601	ng/r	0.58		운	2	Ð	£	9	9	2	€	£
vinyl Ether EPA 601 (1) ug/L 0.44 ND N	trans-1,3-Dichloropropene	109	J/gn	0, 39		2	9	9	9	2	9	2	9	Q
EPA 601 (1) ug/L 0,37 ND	2-Chloroethylvinyl Ether	109	ng/L	0.44		9	2	2	9	9	9	윷	2	2
EPA 601 (1) ug/L 0,29 ND ND ND ND ND ND ND ND ND EPA 601 (1) ug/L 0,42 ND	Chlorobenzene	- 109	ng/L	0.37		¥	2	9	2	2	9	2	9	QN
EPA 601 (1) ug/L 0,42 ND	1,2-Dichlorobenzene	109	√L J	0,29		ş	9	Q	9	£	9	9	읒	2
EPA 601 (1) ug/L 0,41 NO NO NO NO NO NO NO NO	1,3-Dichlorobenzene	109	ng/L	0.42		9	2	2	2	2	9	2	2	Q
	1,4-Dichlorobenzene	109	ng/L	0.41		9	9	Q	Q	Q	Q	9	9	9

DATACHBA AVALYTICAL REPORT Duluth IAP - Water Samples

			Detection	Field #:	GW7-A	GW7 -B	GW7 -C	AT-32	GW8 -A	GW8 +B	GWB-C	SM-8A	S#-88
Per ane ter	Met hod	un ts	Limit	Site :	SEVEN	SEVEN	SEVEN	SEVEN	EI GHT	EI GHT	EI GHT	E1 GHT	EIGHT
Purgeable Halocarbons	EPA 601 (1)	ug/L	MDL (2)										
Chloromethane	EPA 601 (1)	ng/r	0.49		2	2	2	Q	2	2	9	9	9
Methylene Chloride	EPA 601 (1)	ug/L	0.34		9	2.5	2	9	2	2.8	9	9	Q
Carbon Tetrachloride	EPA 601 (1)	ug/r	0.46		2	9	9	Q	9	2	9	9	2
Bromodichioromethane	EPA 601 (1)	ug/L	0,35		9	9	2	9	9	9	9	9	Q
Dibromochi orgnethane	EPA 601 (1)	ug/L	0,31		9	9	2	2.9	9	2	2	9	9
Br oncmethane	EPA 601 (1)	ng/L	0.63		9	9	2	2	9	2	9	9	S
Dichlorod 1fluoromethane	EPA 601 (1)	ng/r	0,33		£	9	2	2	2	2	9	9	Ð
Trichlorofluoromethane	EPA 601 (1)	ug/L	0.44		2	9	9	2	2	1,2	9	9	Q
Chloroform	EPA 601 (1)	J/gn	0.45		9	7.0	9	9	2	2	9	2	9
Branoform	EPA 601 (1)	ng/L	0.45		2	9	2	2	2	2	2	9	9
Chloroethane	EPA 601 (1)	ug/L	0,38		9	2	2	9	9	9	2	9	æ
1,1-Dichloroethane	EPA 601 (1)	ng/L	0.49		9	9	9	2	9	2	9	9	Q
1,2-Dichloroethane	EPA 601 (1)	ng/r	0.44		9	0,82	9	0.83	9	2	2	윷	9
1,1,1-Trichloroethane	EPA 601 (1)	J/gn	0,53		9	9	2	9	2	2	9	9	Q
1,1,2-Tr ichi oroethane	EPA 601 (1)	J/gn	0.51		2	9	9	9	2	9	9	2	9
1,1,2,2-Tetrachloroethane	EPA 601 (1)	ug/L	98.0		9	9	2	9	9	2	2	9	Q
Vinyl Chloride	EPA 601 (1)	7/bn	0.54		9	9	9	9	2	9	9	9	9
1,1-Dichloroethene	EPA 601 (1)	ng/L	0.49		9	9	9	9	2	9	9	9	Q
trans-1,2-Dichloroethene	EPA 601 (1)	ng/L	0.42		9	₽	9	7.2	9	9	9	2	2
Tr ichloroethene	EPA 601 (1)	ng/L	09*0		9	220.	-	5.1	9	9	2	9	QN
Tetrachi oroethene	EPA 601 (1)	ug/L	0.38		9	9	₽	7.6	9	9	2	9	9
1,2-Dichloropropane	EPA 601 (1)	ug/L	0.20		9	2	2	9	9	9	2	9	Q
cis-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.58		2	9	2	ᄝ	9	9	9	9	9
trans-1,3-Dichloropropene	EPA 601 (1)	ug/L	0,39		9	2	2	9	2	9	9	2	Q
2-Chloroethylvinyl Ether	EPA 601 (1)	ug/L	0.44		₽	2	9	2	운	9	2	9	身
Chlorobenzene	EPA 601 (1)	ug/L	0.37		Ş	9	9	9	9	2	9	9	9
1,2-Dichlorobenzene	EPA 601 (1)	ug/r	0,29		₽	2	2	Q	윤	¥	₹	2	2
1,3-Dichlorobenzene	EPA 601 (1)	ng/L	0.42		9	9	2	2	9	9	9	9	오
1,4-Dichlorobenzene	EPA 601 (1)	ng/L	0.41		9	2	2	9	9	9	9	9	9

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DATACHBA MALYTICAL REPORT Duluth IAP - Water Samples

					TRIP	TRIP	R.P	RINSE
			Detection	Fleid #:	BLANK	BLANK	BLANK	BLANK
Parameter	Method	SH its	- i = i -	Site :	FOUR	SEVEN	EIGHT	THREE
Purgeable Halocarbons	EPA 601 (1)	√lgu	MDL (2)					
Chloromethane	EPA 601 (1)	ug/r	0.49		2	₹	9	2
Methylene Chloride	EPA 601 (1)	ug/L	0.34		2	Ð	2	35.
Carbon Tetrachloride	EPA 601 (1)	√L Jon	0.46		2	9	9	€
Bromodichloromethane	EPA 601 (1)	ug/L	0.35		£	2	2	1.5
Dibramochi oramethane	EPA 601 (1)	J/gu	0,31		2	웆	2	QN
Bromanethane	EPA 601 (1)	ug/L	0.63		2	2	9	ON
Dichlorodifiuoromethane	EPA 601 (1)	J/gu	0.33		Ð	9	9	Q
Trichlorofluoromethane	EPA 601 (1)	ng/L	0.44		2	9	9	ON
Chloroform	EPA 601 (1)	√l/gn	0.45		9	5.4	9	8.6
Bromoform	EPA 601 (1)	ng∕L	0.45		2	9	9	QN
Chloroethane	EPA 601 (1)	J/Bn	0.38		Ð	9	9	Q
1,1-Dichloroethane	EPA 601 (1)	ng/L	0.49		£	9	2	QN
1,2-Dichloroethane	EPA 601 (1)	ng/L	0.44		2	3	9	Q
1, 1, 1-Trichloroethane	EPA 601 (1)	ng/L	0,53		2	9	9	QN
1,1,2-Tr ichi oroethane	EPA 601 (1)	J∕gv	0.51		Ð	2	2	Q
1, 1, 2, 2-Tetrachloroethane	EPA 601 (1)	ng/L	0, 38		2	2	2	QN
Vinyi Chloride	EPA 601 (1)	ug/L	0.54		9	9	9	2
1,1-Dichloroethene	EPA 601 (1)	ng/L	0.49		2	9	2	QN
trans-1,2-Dichloroethene	EPA 601 (1)	ng/r	0.42		ð	9	2	₽
Tr ichioroethene	EPA 601 (1)	ng/L	09*0		8	9	2	QN
Tetrachi oroethene	EPA 601 (1)	ng/r	0,38		2	욧	9	0.52
1,2-Dichloropropane	EPA 601 (1)	ng/L	0,20		9	2	2	Q
c is-1,3-Dichloropropene	EPA 601 (1)	ng/L	0.58		9	Q	2	₽
trans-1,3-Dichloropropene	EPA 601 (1)	ug/L	0,39		9	2	9	ON
2-Chi oroethylvinyl Ether	EPA 601 (1)	ug/L	0.44		9	9	£	윷
Chlorobenzene	EPA 601 (1)	ng/L	0.37		9	2	2	QN
1,2-Dichlorobenzene	EPA 601 (1)	J/6n	0.29		9	Ş	9	2
1, 3-Dichlorobenzene	EPA 601 (1)	ng/L	0.42		9	9	9	QN
1,4-Dichlorobenzene	EPA 601 (1)	√Sh	0.41		9	9	9	9

DATACHEN ANALYTICAL REPORT Duluth IAP - Water Samples

			Detection	Field #:	GW1-A	GW1-C	GW1-D	GW1-E	SW-1A	SW-1B	GW2-A TWD	GW2-B TWO	GW2-C TWO
Per anoter	Method	t i es	Limit	Site :	ONE	ON ON	CNE	2	1				
Purgeable Archetics	EPA 602 (1)	ng/L	MOL (2)		•	ç	9	ç	9	£	2	9	Ş
Benzene	EPA 602 (1)	ug/L	0.25		2 9	2 9	€ ⊊	2 5	2	9	2	2	ON
To I uane	EPA 602 (1)	ug/L	0.64		2 9	2 9	2 9	9 9	9	2	9	9	2
Ethyl benzene	EPA 602 (1)	ng/r	0.75		2 9	9 9	2 2	2	2	2	9	9	Q
o-Xy lene	EPA 602 (1)	ug/L	9/*0		2 9	2	9	9	Ð	9	9	9	æ
eue 1 X-#	EPA 602 (1)	. kg/r	0,45		2 5	9 9	2	2	2	9	2	2	Q
p-Xy lene	EPA 602 (1)	J∕gn	8/*0		5 5	9 9	9	2	2	2	g	윤	2
Chlorobenzene	EPA 602 (1)	رو ا	0.55		2 9	9 9	9	9	2	9	2	2	Q
1,2-Dichlorobenzene	EPA 602 (1)	ng/L	0.47		2 9	2 2	9	2	2	2	2	Z	2
1,3-Dichlorobenzene	EPA 602 (1)	ار ال	0.95		2 2	9 9	2	2	2	9	2	2	2
1.3-Dichlorobenzene	EPA 602 (1)	ng/L	44.0		})	!						

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DATACHEN ANALYTICAL REPORT Duluth IAP - Water Samples

			Detection	Field #:	GW2-D	GW2-E	SW-2A	SW-2B	SW-2C	MM-1	MM-2	MM-4	MM-5
Parameter	Method	5	Limit	Site :	DWO.	OME.	ONE.	TWO	OM.	TWO	OMT	TWO	OML
Purgeable Aromatics	EPA 602 (1)	ug/r	MDL (2)										
Benzene	EPA 602 (1)	ng∕L	0,25		2	9	9	윷	2	9	2	9	9
To I uane	EPA 602 (1)	ng/L	0.64		2	2	9	9	2	9	2	9	QN
Ethy i benzene	EPA 602 (1)	ng/r	0.75		2	2	9	Ð	2	2	2	9	身
o-Xylene	EPA 602 (1)	ng/L	0.78		2	2	2	2	2	9	2	9	QN
m-Xy I ene	EPA 602 (1)	ng/r	0.45		9	9	9	9	Ð	9	9	9	9
p-Xylene	EPA 602 (1)	ng/L	0.78		2	2	9	2	2	9	2	2	QN
Ch I orobenzene	EPA 602 (1)	J/gu	0.35		9	æ	9	윷	9	2	2	9	9
1,2-Dichiorobenzene	EPA 602 (1)	ng/L	0.47		9	9	2	2	9	2	9	2	Q
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.93		9	2	9	Ð	£	2	9	9	9
1,3-Dichlorobenzene	EPA 602 (1)	ng/L	0.44		2	9	9	9	9	9	2	9	Q.

DATACHEM ANALYTICAL REPORT Duluth IAP - Water Samples

			Detection	Field#:	9- MW	MM-7	GW3-A	GW3-B	GW3-C	GW3~D	SW-3A	S#-3B	SW-3C
Parameter	Method	u ts	Limit	Site :	1 *O	D#0	THREE	THREE	THREE	THREE	THREE	THREE	THREE
Purgeable Aromatics	EPA 602 (1)		MDL (2)										
Benzene	EPA 602 (1)		0.25		æ	Q	⊋	₹	윷	2	⊋	£	2
To I uene	EPA 602 (1)		0.64		⊋	2	2	36.	9	2	2	2	Q
Ethy i benzene	EPA 602 (1)		0.75		Ð	Q	Ð	Q	Ş	Q	Ð	Ş	Q
o-Xy lene	EPA 602 (1)		0.78		2	2	2	₹	2	9	9	9	QN
m-Xylene	EPA 602 (1)	7/Bn	0.45		2	9	⊋	Ð	Ð	9	9	9	ᄝ
p-Xylene	EPA 602 (1)		0.78		2	9	2	2	2	Ð	9	9	QN
Chlorobenzene	EPA 602 (1)		0,35		2	Ð	윤	9	9	Q	9	Ð	æ
1,2-Dichlorobenzene	EPA 602 (1)		0.47		2	7	9	9	2	9	9	9	ON
1,3-Dichlorobenzene	EPA 602 (1)		0.93		⊋	₽	9	Ą	9	¥	2	윷	Q
1,3-Dichlorobenzene	EPA 602 (1)		0.44		2	⊋	9	2	9	9	9	2	QN

DATACHBA ANALYTICAL REPORT Duluth IAP - Water Samples

			Detection	Field #:	GW4-A	GW4-B	GW4 -C	GW4-D	SW-4A	SE-4B	SW-4C	SW-4D	MM-8
Parameter	Method	Units	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgeable Aromatics	EPA 602 (1)		MDL (2)										
Benzene	EPA 602 (1)		0.25		Ð	Ð	9	¥	2	15.	89.	8.9	윷
Toluene	EPA 602 (1)		0.64		9	9	9	9	2	2	2.0	2	QN
Ethyl benzene	EPA 602 (1)		0.75		9	9	9	9	9	9	윷	2	2
o-Xy lene	EPA 602 (1)		0,78		2	물	9	9	2	2	9	9	QN
m-Xylene	EPA 602 (1)		0.45		9	9	9	윷	9	2	73.	2	2
p-Xy lene	EPA 602 (1)		0,78		9	2	9	9	2	2	9	2	Q
Chlorobenzene	EPA 602 (1)		0,35		9	Ð	2	9	2	9*	2.8	2	용
1,2-Dichlorobenzene	EPA 602 (1)	ug/L	0.47		9	2	9	9	2	9	2	2	S
1,3-Dichlorobanzana	EPA 602 (1)		0.93		2	2	2	₽	욧	9	9	£	9
1,3-Dichlorobenzene	EPA 602 (1)		0.44		9	2	9	9	2	₽	9	9	Q

DATACHER ANALYTICAL REPORT Duluth IAP - Water Samples

Perameter	Method	st i es	Defection Limit	Field#: Site :	MM~9 FOUR	MM-10 FOUR	MM-11 FOUR	GW5-A F I VE	GW5-B FIVE	GW5-C F I VE	SW-5A FIVE	SW-5B F I VE	SW-5C FIVE
Purgeable Aronatics Benzene Toluene Ethyl benzene o-Xylene m-Xylene p-Xylene Chlorobenzene 1,2-Dichlorobenzene 1,3-Dichlorobenzene	EPA 602 (1)	1/6n 1/6n 1/6n 1/6n 1/6n 1/6n 1/6n 1/6n	MDL (2) 0,25 0,64 0,75 0,75 0,78 0,78 0,78 0,35 0,35 0,93		5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	9999999999	5 5 5 5 5 5 5 5 5	9999999999	9999999999	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	999999999	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9

DATACHEN ANALYTICAL REPORT Duluth IAP - Water Samples

			Detection	Field #:	GW7 -A	GW7 -B	GW7 -C	SW-7A	GW8-A	GW8-B	C\$48	SW-8A	SW-88
Parameter	Method	Units	Limit	Site :	SEVEN	SEVEN	SEVEN	SEVEN	E1 GHT	EI GHT	EI GHT	EI GHT	EI GHT
Purgeable Arcmatics	EPA 602 (1)	ng/L	MDL (2)										
Benzene	EPA 602 (1)		0,25		⊋	¥	⊋	Q	2	₽	₹	2	Q
Toluene	EPA 602 (1)	ug/L	0.64		S	2	2	2	2	2	9	9	6.5
Ethylbenzene	EPA 602 (1)		0.75		9	2	2	¥	2	2	9	2	Q
o-Xy lene	EPA 602 (1)		0.78		Ð	Ð	Ð	9	9	2	9	2	QN
m-Xy lene	EPA 602 (1)		0.45		Q	9	Ð	Ð	2	2	9	9	2
p-Xylene	EPA 602 (1)		0.78		9	9	9	9	9	9	9	2	QN
Chlorobenzene	EPA 602 (1)		0,35		9	⊋	7	S	Ð	9	₹	2	Q
1,2-Dichlorobenzene	EPA 602 (1)	ug/L	0.47		2	Ð	9	9	Q	2	9	9	QN
1,3-Dichlorobenzene	EPA 602 (1)		0.93		Ð	Ð	₹	9	ş	Ð	9	9	Q
1, 3-Dichlorobenzene	EPA 602 (1)		0.44		₹	9	9	2	9	2	2	9	QN

DATACHEM AMALYTICAL REPORT Duluth IAP - Water Samples

RINSE BLANK FIVE	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
BLANK	999999999
TRIP BLANK SEVEN	99999999
TR 1P BLANK FOUR	99999999
Field #: Site :	
Detection Limit	MDL (2) 0.25 0.64 0.75 0.78 0.78 0.35 0.35 0.44
en its	7/6n 7/6n 1/6n 1/6n 1/6n 1/6n 1/6n 1/6n 1/6n
Ne thod	EPA 602 (1)
Parameter	Purgeable Archatics Benzene Toluene Ethylbenzene o-Xylene p-Xylene Chlorobenzene 1,2-Dichlorobenzene 1,3-Dichlorobenzene

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			Dete	ction			GW1-C	GW1-D	GW1-E	SW-1A	SW-18	GW3-A	GW3-B	GW3-C
Parameter	Method	Un I ts	기	mi+	Site :		ONE	ONE	ONE	ONE	ONE	THREE	THREE	THREE
Pesticides	EPA 608 (1)	ug/L	MDL (2)	MDL (†)										
Aldrin	EPA 608 (1)	ug/L		0.02		2	9	2	ð	£	(±)	9	Q	2
alpha-BHC		ug/L		0.004		9	9	2	2	0.01	0.02	9	2	Ş
beta-8HC	EPA 608 (1)	ug/L		0,005		9	2	2	9	2	2	9	9	9
delta-BHC	EPA 608 (1)	ng/L		90000		9	2	2	9	æ	2	2	2	Q
Lindane	EPA 608 (1)	√l Mg/L		0,005		9	9	9	9	2	2	9	2	9
Chlordane	EPA 608 (1)	ng/t		0.05		9	2	2	9	₽	9	9	2	Ş
4,4'-000	EPA 608 (1)	ng/L		0.003		身	2	2	9	2	2	9	₽	윷
4,4,-006	EPA 608 (1)	ug/L		90000		9	2	9	9	9	2	9	9	Q
4 ,4 '-DOT	EPA 608 (1)	√l/gv		0.01		윤	2	2	9	윷	2	9	9	S
Dieldrin	EPA 608 (1)	ug/L		0,002		2	2	2	2	2	9	9	9	Q
Endosultan 1	EPA 608 (1)	ug/L		0.036		9	Q	Q	9	2	2	2	9	2
Endosultan 11	EPA 608 (1)	ug/L		0.012		2	2	2	9	2	2	2	2	Q
Endosulfan Sulfate	EPA 608 (1)	ng/r		0.01		9	9	9	9	2	9	9	£	2
Endrin	EPA 608 (1)	ng/L		0,02		9	2	2	9	2	9	9	9	9
Endrin Aldehyde	EPA 608 (1)	J/gn		0.01		Ð	Ð	2	2	2	9	2	9	2
Heptachlor	EPA 608 (1)	ng/L		0,005		9	9	2	2	9	9	9	2	2
Heptachior Epoxide	EPA 608 (1)	J/gn		0,002		£	æ	9	9	2	9	2	윷	2
Toxaphene	EPA 608 (1)	ng/L	0.25	0,25		2	9	2	9	9	9	2	9	QN
Arochlor 1016	EPA 608 (1)	ng/L		60°0		9	9	9	2	9	2	2	2	2
Arochlor 1221	EPA 608 (1)	ug/L		60.0		2	2	2	2	2	2	2	9	Q
Arochlor 1232	EPA 608 (1)	ug/L		60.0		Ð	9	Q	9	2	9	9	윷	2
Arochior 1242	EPA 608 (1)	ng/L		60°0		2	9	2	2	9	9	2	9	Q
Arochior 1248	EPA 608 (1)	ug/L		60.0		9	2	2	2	9	2	9	2	9
Arochlor 1254	EPA 608 (1)	ng/L	60°0	60°0		9	2	2	9	9	2	2	9	Q
Arochior 1260	EPA 608 (1)	ug/L		60°0		9	QN	9	2	2	2	2	2	2

⁽¹⁾ This group of samples was analyzed on two instruments. Data collected from the second instrument is indicated by t.

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•	Met hod	2	5	± I €	SI 10	¥	¥	¥	HARE E	- AE	1 1	1	1	7 VE
, 1	A 608 (1)	ug/L	MDL (2)	MDL (†)										
	A 608 (1)	ug/L		0.02		Q	(±)	ND (+)	ND (+)	Ş	S	Ş	ND (B)	ND (B)
a pha-thC	EPA 608 (1)	ug/L		0.004		2	S	2	2	9	2	9	9	2
beta-BHC EPA	(1) 809 V	J/gv		0.005		Ą	Ş	₽	2	Q	9	2	⊋	£
delta-BHC EPA	M 608 (1)	ng/L		900°0		2	9	9	2	2	9	2	2	Q
Lindane EP	EPA 608 (1)	ug/L		0.005		9	g	윷	2	9	9	Q	Q	ð
Chlordane EP	EPA 608 (1)	ug/L		0.05		Ð	9	9	2	2	2	2	9	Q
4,4'-000 EP	EPA 608 (1)	ng/L		0,003		Q	9	£	2	9	욧	2	Q	2
4,4*-DDE EPA	(1) 809 V	ug/L		90000		2	2	9	2	2	9	9	9	QN
	A 608 (1)	ug/L		0.01		딮	Q	9	2	9	9	2	9	S
	EPA 608 (1)	ng/L		0,002		2	9	9	2	2	9	5	9	QN
Endosulfan 1 EPA	(1) 809 V	ng/r		0.036		Ð	2	2	2	9	9	9	9	9
=	EPA 608 (1)	ng/L		0,012		9	9	9	2	9	2	2	2	S
Endosultan Sultate EPA	₩ 608 (1)	ug/L		0.01		9	2	9	⊋	9	2	욧	⊋	읖
	₩ 608 (1)	ug/L		0.02		2	9	9	2	9	9	2	2	Q
Endrin Aldehyde EP	EPA 608 (1)	J/gv		0.01		£	æ	€	æ	Ð	2	⊋	2	⊋
		ng/L		0,005		2	9	2	2	9	9	2	2	Q
Heptachlor Epoxide EP	EPA 608 (1)	√l/gv		0.002		9	오	2	9	9	Ð	S	2	9
Toxaphene EP	EPA 608 (1)	√L ng/L	0.25	0,25		9	9	9	2	9	9	2	2	Q
Arochior 1016 EP	(1) 809 V	ng/t		60*0		Ş	Q	QN	QN	9	Ą	Q	9	9
	A 608 (1)	ng/L		60*0		2	2	2	2	9	2	2	2	Q
~4	EPA 608 (1)	ng/r		60.0		Ð	2	9	Q	웆	ջ	₹	ᄝ	₽
	A 608 (1)	ug/L		60.0		9	₽	2	9	2	9	2	9	Ş
Arochlor 1248 EP	EPA 608 (1)	ug/L		60.0		Q	Q	Q	Q	₽	웆	9	Q	2
	EPA 608 (1)	ug/L		0.09		2	2	2	9	2	2	Ð	2	Q
_	EPA 608 (1)	ug/L		60.0		Ş	¥	2	Q	₽	9	2	9	9

^{*} Revised 07/10/87 (f) This group of samples was analyzed on two instruments. Data collected from the second instrument is indicated by t.

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			Detec	ction		SW-5C	GW7-A	GW7-B	CW7 -C	SW-7A	GWB -A	GWB-B	CW8-C	SW-BA
Parameter	Method	units			Site :	FIVE	SEVEN	SEVEN	SEVEN	SEVEN	E1 GHT	E1 GHT	E1 GHT	EIGHT
Pesticides	EPA 608 (1)	ug/L	MDL (2)	MDL (†)										
Aldrin	EPA 608 (1)	J/gv	0,007	0,02		9	g	9	9	£) Q	2	9	9	NO (+)
alpha-BHC	EPA 608 (1)	ug/L	90000	0.004		2	2	2	2	9	2	2	2	웆
beta-BHC	EPA 608 (1)	1/60	90000	0,005		9	2	S	Q	9	¥	2	2	9
delta-BHC	EPA 608 (1)	ng/L	0,002	90000		9	9	2	9	9	2	2	2	Q
Lindane	EPA 608 (1)	ng/r	0,005	0,005		윷	9	9	Q	9	2	9	2	2
Chlordane	EPA 608 (1)	ng/L	0.01	0.05		9	9	2	9	2	2	9	2	9
4.4'-000	EPA 608 (1)	1/bn	0.004	0,003		S	⊋	2	Ş	2	9	9	2	0000
4,4'-00E	EPA 608 (1)	ng/L	0.005	900.0		2	2	2	9	9	2	2	2	Ð
4,41-001	EPA 608 (1)	1/60	0.03	0.01		9	9	ş	9	9	2	2	2	9
Dieldrin	EPA 608 (1)	ng/L	0,005	0,002		9	9	2	9	2	2	2	2	웆
Endosultan 1	EPA 608 (1)	, g	0.01	0.036		Q	9	9	9	2	2	2	2	2
Endosultan 11	EPA 608 (1)	ng/L	0.01	0,012		2	9	9	9	2	9	9	2	Q.
Endosultan Sultate	EPA 608 (1)	ng/L	0.01	0.01		2	9	9	9	2	Ð	2	9	2
Endrin	EPA 608 (1)	ug/L	900.0	0.02		9	9	2	2	9	9	9	2	Q
Endrin Aldehyde	EPA 608 (1)	1/60	0.01	0.01		₽	9	9	S	2	2	9	2	2
Heptachlor	EPA 608 (1)	√V nd/L	0.007	0,005		2	9	2	2	2	2	2	2	ջ
Heptachlor Epoxide	EPA 608 (1)	ug/L	900.0	0,002		9	윷	9	9	2	2	2	9	2
Toxaphene	EPA 608 (1)	ug/L	0.25	0,25		9	9	9	2	2	2	2	2	Q
Arochier 1016	FPA 608 (1)	1/011	0.09	60.0		9	9	9	2	2	9	9	9	9
Arochlor 1221	EPA 608 (1)	1/on	0.0	0,09		9	2	9	2	2	2	2	2	QN
Arochlor 1232	809	, bu	0.09	0.09		9	Ð	9	ᄝ	2	Ð	2	2	9
Arochlor 1242	608	ng/L	0.0	0.0		2	2	9	9	2	2	2	2	9
Arochlor 1248	EPA 608 (1)	J/bu	0.09	60.0		£	9	2	Ð	9	9	2	9	£
Arochlor 1254	608	, 00/L	0.0	60.0		2	2	9	2	9	2	2	2	Q
Arothor 1260		, SQ , L	60.0	0.09		2	2	Ş	2	ð	2	용	⊋	9
		.	,	,										

(†) This group of samples was analyzed on two instruments. Data collected from the second instrument is indicated by t.

DATACHBA ANALYTICAL REPORT Duluth IAP - Water Samples

Detection Field #: SW-88 Classes Class								TRIP	TRIP	
Parameter Method Units Limit Site EIGHT FPA 608 (1) ug/L 0,007 0,02 ND (t) HC EPA 608 (1) ug/L 0,007 0,02 ND (t) HC EPA 608 (1) ug/L 0,006 0,006 0,006 ND HC EPA 608 (1) ug/L 0,006 0,006 0,006 ND HC EPA 608 (1) ug/L 0,006 0,006 ND ND EPA 608 (1) ug/L 0,007 0,005 0,006 ND EPA 608 (1) ug/L 0,007 0,007 0,007 0,007 Aldehyde EPA 608 (1) ug/L 0,01 0,01 0,01 Aldehyde EPA 608 (1) ug/L 0,01 0,01 0,01 Aldehyde EPA 608 (1) ug/L 0,005 0,005 ND Aldehyde EPA 608 (1) ug/L 0,01 0,01 ND Aldehyde EPA 608 (1) ug/L <th></th> <th></th> <th></th> <th>Dete</th> <th>ction</th> <th>Fleid #:</th> <th>SW-88</th> <th>BLANK</th> <th>BLANK</th> <th></th>				Dete	ction	Fleid #:	SW-88	BLANK	BLANK	
EPA 608 (1) ug/L MDL (2) MDL (1) EPA 608 (1) ug/L 0.007 0.02 HC EPA 608 (1) ug/L 0.006 0.004 C EPA 608 (1) ug/L 0.006 0.005 HC EPA 608 (1) ug/L 0.006 0.005 HC EPA 608 (1) ug/L 0.005 0.005 D EPA 608 (1) ug/L 0.010 0.05 E EPA 608 (1) ug/L 0.010 0.05 T EPA 608 (1) ug/L 0.004 0.005 T EPA 608 (1) ug/L 0.010 0.01 Han 11 EPA 608 (1) ug/L 0.010 0.012 Fan 11 EPA 608 (1) ug/L 0.010 0.012 Fan Sulfate EPA 608 (1) ug/L 0.006 0.005 Fan Sulfate EPA 608 (1) ug/L 0.009 0.009 Fan Sulfate EPA 608 (1) ug/L 0.09 0.009 Fan Sulfate EPA 608 (1) ug/L 0	Parameter	Method	ST I ts	٦	+ i =	Site :	EIGHT	ONE	SEVEN	
EPA 608 (1) ug/L 0.007 0.02 EPA 608 (1) ug/L 0.006 0.004 EPA 608 (1) ug/L 0.006 0.005 EPA 608 (1) ug/L 0.005 0.005 EPA 608 (1) ug/L 0.01 0.01 EPA 608 (1) ug/L 0.00 0.005 EPA 608 (1) ug/L 0.00 0.005 EPA 608 (1) ug/L 0.009 0.09 EPA 608 (1) ug/L 0.09 0.09	Pest ic ides	EPA 608 (1)	ug/L	MDL (2)	MDL (+)					
EPA 608 (1) ug/L 0.006 0.004 EPA 608 (1) ug/L 0.005 0.005 EPA 608 (1) ug/L 0.002 0.005 EPA 608 (1) ug/L 0.005 0.002 EPA 608 (1) ug/L 0.005 0.002 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.09 0.09	Aldrin	809	ug/L	0.007	0.02		(±) QN	웆	ᄝ	
EPA 608 (1) ug/L 0,006 0,005 EPA 608 (1) ug/L 0,005 0,005 EPA 608 (1) ug/L 0,005 0,005 EPA 608 (1) ug/L 0,01 0,05 EPA 608 (1) ug/L 0,004 0,005 EPA 608 (1) ug/L 0,005 0,005 EPA 608 (1) ug/L 0,005 0,005 EPA 608 (1) ug/L 0,01 0,012 EPA 608 (1) ug/L 0,007 0,005 EPA 608 (1) ug/L 0,09 0,09	al pha-BHC		ug/L	900*0	0,004		9	2	Q	
EPA 608 (1) ug/L 0.005 0.005 EPA 608 (1) ug/L 0.015 0.005 EPA 608 (1) ug/L 0.01 0.05 EPA 608 (1) ug/L 0.004 0.005 EPA 608 (1) ug/L 0.005 0.005 EPA 608 (1) ug/L 0.005 0.005 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.006 0.02 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.09 0.09	beta-BHC		ug/L	90000	0,005		Ð	9	9	
EPA 608 (1) ug/L 0.005 0.005 EPA 608 (1) ug/L 0.01 EPA 608 (1) ug/L 0.004 0.005 EPA 608 (1) ug/L 0.005 0.006 EPA 608 (1) ug/L 0.005 0.005 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.006 0.002 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.009 0.09 EPA 608 (1) ug/L 0.09 0.09	de11a-8HC	_	ng/L	0,002	90000		9	Ð	Q	
EPA 608 (1) ug/L 0.01 0.05 EPA 608 (1) ug/L 0.004 0.003 EPA 608 (1) ug/L 0.005 0.006 EPA 608 (1) ug/L 0.005 0.005 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.01 EPA 608 (1) ug/L 0.00 0.005 EPA 608 (1) ug/L 0.006 0.005 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.006 0.005 EPA 608 (1) ug/L 0.009 0.09 EPA 608 (1) ug/L 0.09 0.09	Lindane	-	ng/L	0.005	0.005		g	9	Ð	
EPA 608 (1) ug/L 0.004 0.005 EPA 608 (1) ug/L 0.005 0.006 EPA 608 (1) ug/L 0.03 0.01 EPA 608 (1) ug/L 0.01 0.036 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.01 EPA 608 (1) ug/L 0.006 0.002 EPA 608 (1) ug/L 0.006 0.005 EPA 608 (1) ug/L 0.09 0.09	Chlordane	EPA 608 (1)	ug/L	0.01	0.05		2	2	QN	
EPA 608 (1) ug/L 0.005 0.006 EPA 608 (1) ug/L 0.03 0.01 EPA 608 (1) ug/L 0.005 0.002 EPA 608 (1) ug/L 0.01 0.036 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.009 0.09 EPA 608 (1) ug/L 0.09 0.09	4,4'-500	EPA 608 (1)	ug/L	0.004	0.003		*600*	9	용	
EPA 608 (1) ug/L 0.03 0.01 EPA 608 (1) ug/L 0.005 0.002 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.01 EPA 608 (1) ug/L 0.00 0.02 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.009 0.09 EPA 608 (1) ug/L 0.09 0.09	4,4'-00€	EPA 608 (1)	ug/L	0.005	90000		9	2	Q	
EPA 608 (1) ug/L 0,005 0,002 EPA 608 (1) ug/L 0,01 0,036 EPA 608 (1) ug/L 0,01 0,012 EPA 608 (1) ug/L 0,01 0,012 EPA 608 (1) ug/L 0,00 0,02 EPA 608 (1) ug/L 0,007 0,005 EPA 608 (1) ug/L 0,007 0,005 EPA 608 (1) ug/L 0,006 0,002 EPA 608 (1) ug/L 0,09 0,09	4,4'-00T	EPA 608 (1)	ug/L	0.03	0.01		0.01	Ş	9	
EPA 608 (1) ug/L 0.01 0.036 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.006 0.02 EPA 608 (1) ug/L 0.001 0.01 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.09 0.09	Di eldr in	EPA 608 (1)	ng/L	0,005	0,002		2	Ð	Q	
EPA 608 (1) ug/L 0.01 0.012 EPA 608 (1) ug/L 0.01 0.01 EPA 608 (1) ug/L 0.006 0.02 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.007 0.005 EPA 608 (1) ug/L 0.006 0.02 EPA 608 (1) ug/L 0.05 EPA 608 (1) ug/L 0.09 0.09	Endosultan 1	EPA 608 (1)	ug/L	0.01	0.036		웆	⊋	9	
EPA 608 (1) ug/L 0,01 0,01 EPA 608 (1) ug/L 0,006 0,02 EPA 608 (1) ug/L 0,01 0,01 EPA 608 (1) ug/L 0,007 0,005 EPA 608 (1) ug/L 0,007 0,005 EPA 608 (1) ug/L 0,25 0,25 EPA 608 (1) ug/L 0,09 0,09	Endosultan 11	EPA 608 (1)	ug/L	0.01	0.012		2	2	Ş	
EPA 608 (1) ug/L 0,006 0,02 EPA 608 (1) ug/L 0,01 0,01 EPA 608 (1) ug/L 0,007 0,005 Ide EPA 608 (1) ug/L 0,006 0,002 EPA 608 (1) ug/L 0,25 0,25 EPA 608 (1) ug/L 0,09 0,09	Endosulfan Sulfate	EPA 608 (1)	7/gn	0.01	0.01		g	9	2	
EPA 608 (1) ug/L 0,01 0,01 EPA 608 (1) ug/L 0,007 0,005 Ide EPA 608 (1) ug/L 0,006 0,002 EPA 608 (1) ug/L 0,25 0,25 EPA 608 (1) ug/L 0,09 0,09	Endr in	EPA 608 (1)	ug/L	900.0	0.02		2	9	Q	
EPA 608 (1) ug/L 0,007 0,005 Ide EPA 608 (1) ug/L 0,25 0,25 EPA 608 (1) ug/L 0,25 0,25 EPA 608 (1) ug/L 0,09 0,09	Endrin Aldehyde		ug/L	0.01	0.01		Ş	2	9	
EPA 608 (1) ug/L 0,006 0,002 EPA 608 (1) ug/L 0,25 0,25 EPA 608 (1) ug/L 0,09 0,09	Heptachlor	EPA 608 (1)	ug/L	0.007	0,005		2	9	9	
EPA 608 (1) ug/L 0,25 0,25 EPA 608 (1) ug/L 0,09 0,09	Heptachlor Epoxide	EPA 608 (1)	1/bn	90000	0.002		Ð	Q	9	
EPA 608 (1) ug/L 0.09 0.09	Toxaphene	809	ng/L	0,25	0,25		2	2	QN	
EPA 608 (1) ug/L 0.09 0.09	Arochlor 1016	909	ug/L	0,09	60*0		Ð	Q	Q	
1232 EPA 608 (1) ug/L 0,09 0,09 1242 EPA 608 (1) ug/L 0,09 0,09 1248 EPA 608 (1) ug/L 0,09 0,09 1254 EPA 608 (1) ug/L 0,09 0,09 1254 EPA 608 (1) ug/L 0,09 0,09	Arochlor 1221	809	ng/L	& •0	60°0		2	9	ON	
1242 EPA 608 (1) ug/L 0.09 0.09 1248 EPA 608 (1) ug/L 0.09 0.09 1254 EPA 608 (1) ug/L 0.09 0.09 1250 FPA 608 (1) ug/L 0.09 0.09		608	ug/L	60.0	60.0		2	2	9	
1248 EPA 608 (1) ug/L 0,09 0,09 1254 EPA 608 (1) ug/L 0,09 0,09 1760 EPA 608 (1) ug/L 0,09 0,09		809	ng/L	0.09	60°0		2	윤	Q	
1254 EPA 608 (1) ug/L 0.09 0.09		608	ug/L	60.0	60.0		2	9	9	
1360 FPA 608 (1) 44/1 0.09 0.09		809	ng∕L	0.09	0.09		£	€	Q₩	
	Arochlor 1260	EPA 608 (1)	J/gn	60.0	60.0		₽	9	S	

* Revised 07/10/87 (1) This group of samples was analyzed on two instruments. Data collected from the second instrument is indicated by t.

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DATACHEM ANALYTICAL REPORT Duluth IAP - Water Samples

Par ame ter	Method	units	Detection	Field#: Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SM-1B ONE	GW3-A THREE	GW3-B THREE	GW3-C THREE
Herbicides	EPA 615 (1)	ng/L	MDL (2)										
2,4,5-T	EPA 615 (1)	ug/L	90*0		9	9	2	9	9	9	9	2	9
2,4-0	EPA 615 (1)	ug/L	90*0		9	9	9	9	9	9	2	2	Q
SIIvex	EPA 615 (1)	ug/L	90.0		Q	9	ð	Q	9	9	9	9	9

DATACHEM AMALYTICAL REPORT Duluth IAP - Water Samples

Parameter	Method	un i ts	Detection	Fleid #: Site :	GW3-D THREE	SW-3A THREE	SM-38 THREE	SW-3C THREE	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SM-5A FIVE	SM-5B FIVE
Herbicides	EPA 615 (1)	√g/L	MDL (2)										
2,4,5-T	EPA 615 (1)	ug/L	0.08		9	9	9	g	9	9	2	9	2
2,4-0	EPA 615 (1)	ug/L	0,08		9	9	9	9	9	2	9	9	Q
SIIvex	BA 615 (1)	ug/t	90.0		9	9	9	9	9	9	9	9	2

SM-8A	EGT	!	2	QN	9
9 88 구	E164	9	2	9	9
GW8 -B	E	g	2	Ş	9
GW8-A	100	Ş	}	2	9
AT-NS	SEVEN	Ş	?	€	9
GW7-C		9	! \$	2	9
GW7-B SFVFN		9	ç	9	9
GW7-A SEVEN		0.08	Ş)	2
GM-5C FIVE		Q	ã		2
Fleid #: Site :					
Defection	MDL (2)	0.08	90.0	90	80.0
=	ng/r	ug/L	ug/L	7/91	3
Method	(1) \$19 V-1	EPA 615 (1)	EPA 615 (1)	EPA 615 (1)	
Per amoter	Herbicides	2,4,5-T	2,4−0	Silvex	

DATACHEM ANALYTICAL REPORT Duluth IAP - Water Samples

						TRIP	TRIP	TRIP	
			Detect ion	Field #:	SW-88	BLANK	BLANK	BLANK	
Parameter	Me thod	ا ا ج	Limit	Site :	EIGHT	ONE	THREE	EIGHT	
Herbicides	EPA 615 (1)	ng/L	MDL (2)						
2,4,5-T	EPA 615 (1)	√lon	90*0		9	2	9	Ş	
2,40	EPA 615 (1)	1/6n	90*0		9	9	2	QN	
Silvex	EPA 615 (1)	J/bn	90.0		9	9	2	9	

DATACHBA MALYTICAL REPORT Duluth IAP - Water Samples

			Detection	Field#:	GW1-A	GW1-C	GW1-D	GW1~E	SW-1A	SW-1B	GW2-A	GW2-8	GW2-C
Parameter	Method	ST ITS	Limit	Site :	ONE	ONE	ONE	ONE	ONE	ONE	0 <u>4</u>	DE	TWO
011 and Grease	EPA 413.2 (7)	ا/6 س	_•		9	9	2	2	2	2	£	2.	2
Pheno I I cs	EPA 420.2 (7)	ng/L	5.		9	2	2	9	9	9	9	9	QN
Arsenic	EPA 206.2 (7)	mg/L	0.01		ND (15)	ND (15)	ND (15)	ND (15)	9	Q			
Berlus	EPA 208.1 (7)	mg/L	0.2		1.2	1.2	0.2	0.2	9	Q			
Cadmium	EPA 213.1 (7)	₩g/ Ł	10.0		0.01	0.02	9	9	9	9			
Chronium	EPA 218.1 (7)	mg/L	90.0		1.3	0.64	0.22	0.08	2	QN			
peq	EPA 259.2 (7)	mg/L	0.02		90.0	0.03	AD (13)	ND (13)	Ş	ð			
Mercury	EPA 245.1 (7)	mg/L	0.001		0.001	9	2	9	2	Q			
Selenium	EPA 270.2 (7)	J∕g#	0.01		ND (15)								
Silver	EPA 272.1 (7)	mg/L	0.01		0.03	0.02	2	9	2	9			

NO N
2 S S
24-2C TWO TWO TWO
24-28 TWO TWO
38-2A 1760 1760 1760 1760 1760 1760 1760 1760
GW Z-E
OWZ -D TWO ND ND
Site 6 1 2 3 4 4 4 4 4 4 4 4 4
Limit 1. 5. 0.01 0.2 0.01 0.05 0.05 0.001 0.05
ug/L ug/L mg/L mg/L mg/L mg/L mg/L mg/L
Hethod EPA 413.2 (7) EPA 420.2 (7) EPA 206.2 (7) EPA 213.1 (7) EPA 218.1 (7) EPA 239.2 (7) EPA 230.2 (7) EPA 230.2 (7)
Perameter Oil and Grease Phenolics Arsenic Barium Cadmium Chromlum Lead Mercury Setenium Silver

DATACHEM ANALYTICAL REPORT Duluth IAP - Water Samples

			Detection	Field #:	9-₩	MM-7	GW3-A	GW3-8	GW3-C	GW3-D	SW-3A	SM-38	SW-3C
Parameter	Method	Units		Site :	OML	OM.	THREE	THREE	THREE	THREE	THREE	THREE	THREE
Oil and Grease	EPA 413,2 (7)	J/6m	<u>.</u> •		2	Q	9	9	9	2	-	Ð	Q
Pheno I ics	EPA 420.2 (7)	ug/L	5.		2	9	9	16.	12.	S	9	2	QN
Arsenic	EPA 206.2 (7)	mg/L	0.01				ND (13)	ND (13)	ND (13)	ND (13)	9	0.02	9
Berlum	EPA 208.1 (7)	mg/L	0.2				0.4	- *	2	0.5	2	9*0	0.1
Cadmium	EPA 213,1 (7)	mg/L	0.01				9	Q	9	9	9	0.14	90.0
Chromium	EPA 218,1 (7)	¶g/L	0.05				0,30	0.71	0.01	0,20	9	0.20	Q
Lead	EPA 259.2 (7)	J/6m	0,02				Q	0.03	Ð	2	0.04	0.76	0.14
Mercury	EPA 245.1 (7)	mg/L	0.001				9	9	Ð	9	2	2	Q
Selenium	EPA 270.2 (7)	J/Gm	0.01				ð	QN	9	ð	ND (15)	ND (15)	ND (15)
Silver	EPA 272.1 (7)	mg/L	0.01				9	9	9	9	9	2	Q

DATACHEM ANALYTICAL REPORT Duluth IAP - Water Samples

ć	1	<u>.</u>	Detection	Field #:	GW-4A	GW-48	GW-4C	GW-4D	SW-4A	SW-48	SW-4C	SM-4D	FO.10
Par ame Ter	Mernod	SI SI	- E		5	5	5	5	5				Ś
Oil and Greese	EPA 413.2 (7)	J/gm	<u>.</u>		S	Q	9	9	9	-	2.	9	9
Pheno i ics	EPA 420.2 (7)	ng/L	æ										
Arsenic	EPA 206.2 (7)	1/6m	0.01										
Ber Ius	EPA 208.1 (7)	mg/L	0.2										
Cadmium	EPA 213.1 (7)	mg/L	0.01										
Chromium	EPA 218.1 (7)	mg/L	0.05										
Lead	EPA 239.2 (7)	mg/L	0,02										
Mercury	EPA 245.1 (7)	mg/L	0,001										
Selenium	EPA 270.2 (7)	1/6m	0.01										
Silver	EPA 272,1 (7)	mg/L	0.01										

DATACHEM MALYFICAL REPORT Duluth IAP - Water Samples

			Detection	Field #:	6-MM	MM-10	11 - 11 - 11	GW5-A	GW5-B	GW5-C	SW-5A	SW-5B	S2-5C
Parameter	Method	units	Limit	Site :	FOUR	FOUR	FOUR	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE
Oil and Grease	EPA 413,2 (7)	mg/L	<u>-</u> :		2.	9	9	Q	9	9	Ð	2	9
Pheno i ics	EPA 420.2 (7)	ug/L	5.					9	9	9	9	9	Q
Arsenic	EPA 206,2 (7)	1/6m	0.01					ND (15)					
Barium	EPA 208.1 (7)	mg/L	0.2					9	9	9	9	9	Q
Cadm i um	EPA 213,1 (7)	1/6m	0.01					Q	9	9	9	Ð	Ð
Chronium	EPA 218.1 (7)	mg/L	90.0					9	9	9	9	9	QN
Peed	EPA 239.2 (7)	٦/و٣	0.02					AG (13)	ND (13)	ND (13)	2	9	Ð
Marcury	EPA 245.1 (7)	mg/L	0.001					9	9	9	2	9	Q
Selenium	EPA 270,2 (7)	mg/t	0.01					ND (15)					
Silver	EPA 272.1 (7)	mg/L	0.01					9	9	9	9	2	Q

DATACHEN ANALYTICAL REPORT Duluth IAP - Water Samples

à	1		Detection	Field#:	GW7-A	GW7-B	GW7 -C	SW-7A	GW8-A	GW8-B	GW8-C	SW-8A	SW-88
POL SMO TO	Meriod	UNITS	L 1811	 91 7	SEVEN	SEVEN	SE VEN	SEVEN	5	E GH	5	5	5
Oil and Grease	EPA 413,2 (7)	™ 9/L	<u>-</u> :		2	S	9	-	9	9	2	9	٦.
Pheno I I cs	EPA 420,2 (7)	√L ng/L	5.		9	Ð	28.	9	9	9	2	9	9
Arsenic	EPA 206,2 (7)	1/6m	0.01		(C) (N)	ND (15)	9	ND (15)	ND (13)	ND (13)	ND (13)	ND (15)	ND (15)
Berlus	EPA 208.1 (7)	mg/L	0.2		0.5	0.5	2	2	0.3	0.5	1.0	9	Q.
Cadmium	EPA 213,1 (7)	1/6	0.01		2	Ð	0,02	9	9	9	9	9	9
Chromium	EPA 218,1 (7)	mg/L	0.05		0.11	0,32	2	9	0.10	0,30	0.52	9	QN
Pe-1	EPA 239,2 (7)	1∕6 m	0.02		ND (13)	0.11	웊	9	9	9	9	0.04	0.03
Mercury	EPA 245.1 (7)	mg/L	0.001		9	9	2	9	9	9	2	2	Q
Selenium	EPA 270,2 (7)	J/6 ™	0.01		(S1) ON	ND (15)	2	ND (15)	9	2	2	NO (15)	ND (15)
Silver	EPA 272,1 (7)	mg/L	0.01		2	0.01	2	9	9	2	2	9	Q

DATACHEM ANALYTICAL REPORT Duluth IAP - Water Samples

			Detection	Field #:	TRIP	TR 1 P BLANK	TRIP	TRIP	TR1P BLANK	TRIP	BA1LER RINSE	RI NSE BLANK	BAILER RINSE
Parameter	Mathod	Units	Limit	Site :	FIVE	THREE	FOUR	SEVEN	EIGHT	THREE	SEVEN	EI GHT	EIGHT
Oil and Grease	EPA 413.2 (7)	mg/L	_•				9					2	
Phenolics	EPA 420,2 (7)	J/gu	5.					9	9			2	9
Arsen Ic	EPA 206.2 (7)	mg/L	0,01			ND (13)					₽		
Barium	EPA 208.1 (7)	mg/L	0.2			9					9		
Cadmium	EPA 213.1 (7)	mg/L	0.01			9					ON.		
Chromium	EPA 218.1 (7)	mg/t	90.0			9					9		
[e ed	EPA 239.2 (7)	mg/L	0.02			9					QN		
Mercury	EPA 245.1 (7)	J/6m	0.001		æ	9		9		2	2		
Setenium	EPA 270.2 (7)	mg/L	0.01			9					QN		
Silver	EPA 272.1 (7)	mg/L	0,01			9					2		

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

			Detect ion	Field #:	GW10-A	GW10-B	GW10-C
Parameter	Method	Grits	Limit Site :	Site :	TEN	TEN	TEN
Radiology							
Gross Alpha	Std. Method 703 (11)	pC1/L	-		9 +1 8	18 ± 8	8 + 5
Gross Beta	Std. Method 703 (11)	pCi/L			6 ± 3	12 ± 3	6 + 3
Rad I um-226	Std. Method 706 (11)	pCI/L	9*0		3.4 ± 2.0	5.0 ± 2.8	QN
Radium-228	Std. Method 708 (11) pCi/L	PC1/L	_•		2	9	QN

Footnotes - Analytical Report

"Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater," Federal Register, Volume 49, Number 209, October 26, 1984.

Determined according to the procedure documented in Federal Register, October 26, 1984, Part VIII. 3

Combined analysis of cis and trans isomers with listed detection limit.

Combined analysis of meta, ortho, and para isomers which listed detection limit.

Sample diluted 1:100 for analysis with corresponding increase in detection limit.

"Laboratory Determination of Moisture Content of Soil," ASTM 02216-71. 93939

"Methods for Chemical Analysis of Water and Wastes," EPA Manual 600/4-79-020, USEPA, March, 1983.

"Manual of Analytical Mathods, Third Edition", NIOSH 84-100, 1985, (Modified)

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA SW-846, Second Edition, USEPA, 1982. 6

"Standard Methods for Examination of Water and Wastewater," 16th Edition, American Public Health Associates, 1985. 3 (12)

Sample difuted 1:3 for analysis with corresponding increase in detection limit.

Sample diluted 1:5 for analysis with corresponding increase in detection limit.

(13) 3

Sample diluted 1:8 for analysis with corresponding increase in detection limit.

Sample diluted 1:10 for analysis with corresponding increase in detection limit. (15)

Sample diluted 1:30 for analysis with corresponding increase in detection limit.

Duluth IAP - Soil Samples Holding Time Summary

HB 0-1.5 E TWO /86 11/12/86	/86 11/23/86 ys 11 days	/86 11/23/86 17s 11 days	/86 ys /86 ys	//86 ys y/86 ays	/86 11/24/86 1ys 12 days
SS-1B ONE 11/23/86	12/01/86 8 days	12/01/86 8 days	11/30/86 7 days 12/05/86 5 days	11/28/86 5 days 12/23/86 25 days	12/02/86 9 days
SS-1A ONE 11/23/86	12/01/86 8 days	12/01/86 8 days	11/30/86 7 days 12/05/86 5 days	11/28/86 5 days 12/23/86 25 days	12/02/86 9 days
GW1-E 20-21.5 ONE 11/20/86	12/04/86 14 days	12/04/86 14 days	11/26/86 6 days 12/01/86 5 days	11/26/86 6 days 12/22/86 26 days	12/02/86 12 days
GW1-B 5-6.5 ONE 11/19/86	11/24/86 5 days	11/24/86 5 days	11/27/86 8 days 12/01/86 4 days	11/26/86 7 days 12/22/86 26 days	12/11/86 22 days
GW1-A 10-11.5 ONE	11/24/86 6 days	11/24/86 6 days	11/27/86 9 days 12/01/86 4 days	11/26/86 8 days 12/22/86 26 days	12/11/86 23 days
81-A 5-6.5 ONE 11/19/86	11/24/86 5 days	11/24/86 5 days	11/27/86 8 days 12/01/86 4 days	11/26/86 7 days 12/22/86 26 days	12/11/86 22 days
81-A* 2.5-4 ONE 11/19/86	11/24/86 5 days	11/24/86 5 days	11/21/86 8 days 12/01/86 4 days	11/26/86 7 days 12/22/86 26 days	12/11/86 22 days
B1-A 0-1.5 ONE 11/19/86	11/24/86 5 days	11/24/86 5 days	11/27/86 8 days 12/01/86 4 days	11/26/86 7 days 12/22/86 26 days	12/11/86 22 days
Field #:					
Method(*)	EPA 8010	EPA 8020	EPA 3550/8080	EPA 3550/8150	EPA 163,3

^{*} Revised 07/10/87
(*) Methods documented in previous Analytical Report section.

DATACHEM MALYTICAL REPORT
Duluth IAP - Soll Samples
Holding Time Summary

Parameter SAMPLING DATE Purgeable Helocarbons Date Analyzed Elapsed Time Purgeable Aromatics Date Analyzed Elapsed Time Pesticides/PCBs Date Extracted Elapsed Time Date Analyzed Elapsed Time	Ma Thod EPA 8010 EPA 8020 EPA 8020	Field #:	11/12/86 11/23/86 11/23/86 11 days	B2-B 5-6,5 TWO 11/12/86 11/23/86 11 days 11/23/86	B2-C 0-1.5 TWO 11/17/86 11/25/86 8 days 11/25/86 8 days	82-C 2.5-4 TWO 11/17/86 11/25/86 8 days 8 days 8 days	B2-C 5-6.5 TWO 11/17/86 11/25/86 8 days 8 days	GW2-A 5-6.5 TWO 11/13/86 10 days 11/23/86 10 days	GW2-B 5-6.5 TWO 11/123/86 9 days 11/23/86 9 days	GW2-C 15-165 TW0 11/14/86 9 days 9 days 9 days	GW2-D 15-16,5 TWO 11/17/86 8 days 11/25/86 8 days
Herbicides Date Extracted Elapsed Time Date Analyzed Elapsed Time	EPA 3550/8150										
Moisture Date Analyzed Elapsed Time	EPA 160.3		11/24/86 12 days	11/24/86 12 days	12/02/86 15 days	12/02/86 15 days	12/02/86 15 days	11/24/86 11 days	11/24/86 10 days	11/24/86 10 days	12/02/86 15 days

DATACHEM ANALYTICAL REPORT Duluth 1AP - Soil Samples Holding Time Summary

			GW2-E				B3-A	B3-A	B3-A	83-8	83-8
		Fleid #:	15-16.5	SS-2A	SS-2B	SS-2C	0-1-5	2.5-4	5-6.5	0-1-5	2.5-4
Parameter	Me thod	Site :	TWO	DWD	OWL	OML	THREE	THREE	THREE	THREE	THREE
SAMPLING DATE			11/11/86	11/22/86	11/22/86	11/22/86	11/25/86	11/25/86	11/25/86	11/25/86	11/25/86
Purgeable Halocarbons Date Analyzed	EPA 8010		11/25/86	12/01/86	12/01/86	12/01/86	12/06/86	12/06/86	12/06/86	12/06/86	12/06/86
Elapsed Time			8 days	9 days	9 days	skep 6	11 days				
Purgeable Arcmatics Date Analyzed	EPA 8020		11/25/86	12/01/86	12/01/86	12/01/86	12/06/86	12/06/86	12/06/86	12/06/86	12/06/86
Elapsed Time			8 days	9 days	9 days	9 days	11 days	11 days	11 days	11 days	11 days
Pesticides/PCBs Date Extracted	EPA 3550/8080						12/02/86	12/02/86	12/02/86	12/02/86	12/02/86
Elapsed Time							7 days				
Date Analyzed							12/05/86	12/05/86	12/05/86	12/05/86	12/05/86
Elapsed limo							5 days	5 days	5 days	s days	5 days
Herbicides	EPA 3550/8150						20,00,0	30700701	3070076	7070070	207.007.0
Elapsed Time							7 days	12/02/00 7 days	7 days	7 days	7 days
Date Analyzed							12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Elapsed Time							23 days				
Moisture Date Analyzed Elapsed Time	EPA 160,3		12/02/86 15 days	12/02/86 10 days	12/02/86 10 days	12/02/86 10 days	12/22/86 27 days	12/22/86 27 days	12/22/85 27 days	12/22/86 27 days	12/22/86 27 days
Elapsed Time			15 days	10 days	10 days	10 days	27 days	27 days	27 days		27 days

DATACHEM AMALYTICAL REPORT
Duluth IAP - Soli Samples
Holding Time Summary

			B3-8	83-C	83-C	8 3- C	B3-C	Q#3-V	GM3-B	GW3D	
		Field #:	5-6.5	0-1-5	2.5-4	5-6.5	5-6.5	5-6.5	5-6-5	5-6.5	SS-3A
Parameter	Method	Site :	THREE	THREE	THREE						
SAMPLING DATE			11/25/86	11/25/86	11/25/86	11/25/86	12/01/86	11/26/86	12/02/86*	12/02/86*	11/22/86
Purgeable Halocarbons Date Analyzed	EPA 8010		12/06/86	12/06/86	12/06/86	12/06/86	12/10/86	12/06/86	12/10/86	12/10/86	12/02/86
Elapsed Time			11 days	11 days	11 days	11 days	9 days	10 days	8 days*	8 days*	10 days
Purgeable Arcmatics Date Analyzed	EPA 8020		12/06/86	12/06/86	12/06/86	12/06/68	12/10/86	12/06/86	12/10/86	12/10/86	12/02/86
Elapsed Time			11 days	11 days	11 days	11 days	9 days	10 days	8 days*	8 days*	10 days
Pesticides/PCBs Date Extracted	EPA 3550/8080		12/02/86	12/02/86	12/02/86	12/02/86	12/08/86	12/02/86	12/08/86	12/08/86	11/29/86
Elapsed Time			7 days	6 days	6 days*	6 days*	7 days				
Date Analyzed			12/05/86	12/05/86	12/05/86	12/05/86	12/14/86	12/05/86	12/14/86	12/14/86	12/02/86
Elapsed Time			3 days	3 days	3 days	3 days	6 days	3 days	5 days*	5 days*	6 days
Herbicides	EPA 3550/8150		20100161	30700701	30/00/01	10/03/86	39/00/61	12/02/86	12/08/86	12/08/86	11/28/86
Care Extracted			7 days	7 days	00/20/21 7 days	7 davs	7 days	6 days	\$ days*	6 days*	6 days
Date Analyzed			12/25/86	12/25/86	12/25/86	12/25/86	12/28/86	12/25/86	12/28/86	12/28/86	12/23/86
Elapsed Time			23 days	23 days	23 days	23 days	20 days	23 days	19 days*	19 days*	25 days
Moisture Date Analyzed Elapsed Time	EPA 160.3		12/22/86 27 days	12/22/86 27 days	12/22/86 27 days	12/22/86 27 days	12/22/86 21 days	12/22/86 26 days	12/22/86 20 days*	12/22/86 20 days*	12/02/86 10 days

* Rev i sed 07/10/87

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DATACHEM ANALYTICAL REPORT Duluth 1AP - Soil Samples Holding Time Summary

Parameter SAMPLING DATE Purgeable Halocarbons Date Analyzed Elapsed Time	Method EPA 8010 EPA 8020	Field #:	B4-C 2,5-4 FOUR 12/04/86 12/12/86 8 days	B4-C 5-6,5 FOUR 12/04/86 12/12/86 8 days	84-C 7.5-9 FOUR 12/04/86 12/12/86 8 days	84-D 2,5-4 FOUR 12/04/86 12/12/86 8 days	84-D 5-6.5 FOUR 12/04/86 12/12/86 8 days	84-0 7,5-9 FOUR 12/04/86 12/12/86 8 days	84-E 2,5-4 FOUR 12/05/86 12/13/86 8 days	B4-E 5-6.5 FOUR 12/05/86 12/13/86 8 days	GM4-A 10-11,5 FOUR 12/02/86 12/11/86 9 days
Date Analyzed Elapsed Time Pesticides/PCBs Date Extracted Elapsed Time	EPA 3550/8080		12/12/86 8 days	12/13/86 8 days	12/13/86 8 days						
Elapsed Time Herbicides Date Extracted Elapsed Time Date Analyzed Elapsed Time	EPA 3550/8150										
Moisture Date Analyzed Elapsed Time	EPA 160.3		12/22/86 18 days	12/22/86 17 days	12/22/86 17 days						

DATACHEM AMALYTICAL REPORT Duluth IAP - Soil Samples Holding Time Summary

GW5-B 9,5-11 F1VE 11/21/86	12/04/86 13 days	12/04/86 13 days	11/26/86 5 days 12/01/86 5 days	11/28/86 7 days 12/23/86 25 days	12/02/86 11 days
GW5-A 5-6.5 FIVE 11/21/86	12/04/86 13 days	12/04/86 13 days	11/26/86 5 days 12/01/86 5 days	11/28/86 7 days 12/23/86 25 days	12/02/86 11 days
55-40 FOUR 11/23/86	12/03/86 10 days	12/03/86 10 days			12/02/86 9 days
SS-4C FOUR 11/23/86	12/03/86 10 days	12/03/86 10 days			12/02/86 9 days
55-48 FOUR 11/23/86	12/03/86 10 days	12/03/86 10 days			12/02/86 9 days
55-4A FOUR 11/23/86	12/03/86 10 days	12/03/86 10 days			12/02/86 9 days
GW4-D 5-6.5 FOUR 12/03/86	12/10/86 7 days	12/10/86 7 days			12/22/86 19 days
GW4-C 10-12 FOUR 12/03/86	12/10/86 7 days	12/10/86 7 days			12/22/86 19 days
GW4-B 5-6.5 FOUR 12/03/86	12/10/86 7 days	12/10/86 7 days			12/22/86 19 days
Field					
bott aw	EPA 8010	EPA 8020	EPA 3550/8080	EPA 3550/8150	EPA 160,3
Parameter SAMPLING DATE	Purgeable Halocarbons Date Analyzed Elapsed Time	Purgeable Arcmatics Date Analyzed Elapsed Time	Pesticides/PCBs Date Extracted Elapsed Time Date Analyzed Elapsed Time	Herbicides Date Extracted Elapsed Time Date Analyzed Elapsed Time	Moisture Date Analyzed Elapsed Time

DAIACHBM ANALYTICAL REPORT Duluth IAP - Soll Semples Holding Time Summary

Paramater	Me thod	Fleid#: Site :	GW-5C 10-11.5 FIVE	SS-5A FIVE	SS-58 FIVE	SS-5C FIVE	SS-5D FIVE	SS-5D FIVE	B6-A 0-1.5 SIX	86-A 2,5-4 SIX	86-8 0-1-5 SIX
SAMPLING DATE			11/22/86	11/22/86	11/22/86	11/22/86	11/22/86	11/22/86	11/18/86	11/18/80	11/18/80
Purgeable Halocarbons Date Analyzed Elapsed Time	EPA 8010		12/06/86 14 days	11/24/86 6 days	11/24/86 6 days	11/24/86 6 days					
Purgeable Arcmatics Date Analyzed Elapsed Time	EPA 8020		12/06/86 14 days	11/24/86 6 days	11/24/86 6 days	11/24/86 6 days					
Pesticides/PCBs Date Extracted Elapsed Time Date Analyzed Elapsed Time	Era 3550/8080		11/26/86 4 days 12/01/86 5 days								
Herbicides Date Extracted Elapsed Time Date Analyzed Elapsed Time	EPA 3550/8150										
Moisture Date Analyzed Elapsed Time	EPA 160,3		12/02/86 10 days	12/03/86 15 days	12/03/86 15 days	12/03/86 15 days					

DATACHER ANALYTICAL REPORT
Duluth IAP - Soll Samples
Holding Time Summery

SS-7A* SEVEN 11/24/86	12/08/86 14 days	12/08/86 14 days	5 12/01/86 7 days 6 12/05/86 4 days	6 12/01/86 7 days 6 12/27/86 5 26 days	16 12/22/86 s 28 days
6W7-C 15-16.5 SEVEN 11/24/86	12/08/86 14 days	12/08/86 14 days	12/01/86 7 days 12/05/86 4 days	12/01/86 7 days 12/27/86 26 days	12/22/86 28 dars
GW7-8 10-11.5 SEVEN 11/23/86	12/01/86 8 days	12/01/86 8 days	11/30/86 7 days 12/05/86 5 days	11/28/86 5 days 12/23/86 25 days	12/02/86 9 days
GW7-A 10-11.5 SEVEN 11/23/86	12/01/86 8 days	12/01/86 8 days	11/30/86 7 days 12/05/86 5 days	11/28/86 5 days 12/23/86 25 days	12/02/86 9 days
87-8 2.5-4 SEVEN 11/24/86	12/08/86 14 days	12/08/86 14 days	12/01/86 7 days 12/05/86 4 days	12/01/86 7 days 12/21/86 26 days	12/22/86 28 days
87-8 0-1.5 SEVEN 11/24/86	12/08/86 14 days	12/08/86 14 days	12/01/86 7 days 12/05/86 4 days	12/01/86 7 days 12/27/86 26 days	12/22/86 28 days
87-A 2.5-4 SEVEN 11/24/86	12/08/86 14 days	12/08/86 14 days	12/01/86 7 days 12/05/86 4 days	12/01/86 7 days 12/27/86 26 days	12/22/86 28 days
87-A 0-1.5 SEVEN 11/24/86	12/08/86 14 days	12/08/86 14 days	12/01/86 7 days 12/05/86 4 days	12/01/86 7 days 12/21/86 26 days	12/22/86 28 days
86-8 2,5-4 51X 11/18/86	11/24/86 6 days	11/24/86 6 days			12/03/86 15 days
F161d #:					
We thod	EPA 8010	EPA 8020	EPA 3550/8080	EPA 3550/8150	EPA 160.3
Parameter SAMPLING DATE	Purgentie Halocarbons Date Analyzed Elapsed Time	Purgeable Arcmatics Date Analyzed Elapsed Time	Pesticides/PCBs Date Extracted Elapsed Time Date Analyzed Elapsed Time	Herbicides Date Extracted Elapsed Time Date Analyzed Elapsed Time	Moisture Date Analyzed Elapsed Time

* Rev 1 sed 07/10/87

DATACHBA ANALYTICAL REPORT Duluth IAP - Soil Samples Holding Time Summary

		Fleid #:	B8-A 0-1.5	88-A 2.5-4	B8-A 5-6-5	B8-8 0-1.5	B8-B 2.5-4	88-8 5-6.5	GW8-A 5-6.5	GW8-8 10-11.5	GW8-C 10-11.5
Parameter	Method	Site :	EIGHT	EIGHT	E1GHT	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT
SAMPLING DATE			12/05/86	12/05/86	12/05/86	12/06/86	12/06/86	12/06/86	12/06/86	12/06/86	12/07/86
Purgeable Halocarbons Date Analyzed	EPA 8010		12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/14/86
Elapsed Time			7 days	7 days	7 days	6 days	7 days				
Purgeable Arcmatics Date Analyzed	EPA 8020		12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/17/86	12/12/86	12/12/86	12/14/86
Elapsed Time			7 days	7 days	7 days	6 days	7 days				
Pesticides/PCBs Date Extracted	EPA 3550/8080		12/09/86	12/09/86	12/09/86	12/09/86	12/09/86	12/09/86	12/09/86	12/09/86	12/14/86
Elapsed Time			4 days	4 days	4 days	3 days	7 days				
Date Analyzed			12/14/86	12/14/86	12/14/86	12/14/86	12/14/86	12/14/86	12/14/86	12/14/86	01/08/87
Elapsed Time			5 days	25 days							
Herbicides	EPA 3550/8150										
Date Extracted			12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	
Elapsed Time			6 days	6 days	6 days	5 days					
Date Analyzed			12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	
Elapsed Time			13 days								
Moisture	EPA 160.3										
Date Analyzed Elapsed Time			12/22/86 17 days	12/22/86 17 days	12/22/86 17 days	12/22/86 16 days	12/22/86 15 days				

DATACHBA ANALYTICAL REPORT Duluth IAP - Soil Samples Holding Time Summary

		Fleid #:	SS-8A*	SS-8B*	
Par ameter	Method	Si te :	EI GH	EIGHT	
SAMPLING DATE			11/25/86*	11/25/86*	
Purgeable Helocarbons Date Analyzed Elapsed Time	EPA 8010		12/08/86 13 days*	12/08/86 13 days*	
Purgeable Arcmatics Date Analyzed Elapsed Time	EPA 8020		12/08/86 13 days*	12/08/86 13 days*	
Pesticides/PCBs Date Extracted Elapsed Time Date Analyzed Elapsed Time	EPA 3550/8080		12/02/86 7 days* 12/05/86 4 days*	12/02/86 7 days* 12/05/86 4 days*	
Herbicides De te Extracted Elapsed Time Date Analyzed Elapsed Time	EPA 3550/8150		12/02/86 7 days* 12/27/86 26 days*	12/02/86 7 days* 12/27/86 26 days*	
Moisture Date Analyzed Elapsed Time	EPA 160.3		12/22/86 27 days*	12/22/86 27 days*	

DATACHEM ANALYTICAL REPORT Duluth IAP - Soll Samples Holding Time Summary

			B1-A	81-A	B1-A	GW1-A	G-1-8	GW1-F			H2-B
Parameter	Me thod	Field #: Site :	0-1.5 ONE	2.5.4 ONE	5-6.5 ONE	10-11.5 ONE	5-6.5 ONE	20-21.5 ONE	SS-1A ONE	SS-1B ONE	0-1-5 TWO
SAMPLING DATE			11/19/86	11/19/86	11/19/86	11/18/86	11/19/86	11/20/86	11/23/86	11/23/86	11/12/86
Oil & Grease Date Analyzed	EPA 413.2		12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/09/86	12/09/86	12/09/86	11/26/86
Phenot	EPA 420.2		56/20/c1	36/20/c1	\$6/£0/21	36/20/C1	50/10/c1	19 days	10/02/06	lo days	14 days
Elapsed Time			14 days	14 days	14 days	15 days	14 days	13 days	10 days	10 days	14 days
Arsenic Date Analyzed Elapsed Time	EPA 3050/7060		12/03/86 14 days	12/03/86 14 days	12/03/86 14 days	12/03/86 15 days	12/03/86 14 days	12/09/86 19 days	12/04/86 11 days	12/04/86 11 days	
Ba, Cd, Cr, Pb, Ag Date Analyzed Elapsed Time	EPA 3050/6010/200.7		01/05/87 47 days	01/05/87 47 days	01/05/87 47 days	01/05/87 48 days	01/05/87 47 days	01/12/87 53 days	01/05/87 43 days	01/05/87 43 days	
Mercury Date Analyzed Elapsed Time	EPA 7471		11/26/86 7 days	11/26/86 7 days	11/26/86 7 days	11/26/86 8 days	11/26/86 7 days	12/08/86 18 days	12/04/86 11 days	12/04/86 11 days	
Selenium Date Analyzed Elapsed Time	EPA 3050/7740		12/04/86 15 days	12/04/86 15 days	12/04/86 15 days	12/04/86 16 days	12/04/86 15 days	12/09/86 19 days	12/04/86 11 days	12/04/86 11 days	

CATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples Holding Time Summary

Parameter SAMPLING DATE	Method	Field #: Site :	B2-B 2.5-4 TW0 11/12/86	82-8 5-6.5 TWO	B2-C 0-1.5 TWO 11/17/86	82-C 2.5-4 TWO	82-C 5-6.5 TWO	GW2-A 5-6.5 TWO 11/13/86	GW2-B 5-6.5 TWO 11/14/86	GN2-C 15-16.5 TWO 11/14/86	GW2-D 15-16,5 TW0 11/17/86
Oii & Greese Date Analyzed Elapsed Time	EPA 413,2		11/26/86 14 days	11/26/86 14 days	12/08/86 21 days	12/08/86 21 days	12/08/86 21 days	11/26/86 13 days	11/26/86 12 days	11/26/86 12 days	12/08/86 21 days
Phenolics Date Analyzed Elapsed Time	EPA 420.2		11/26/86 14 days	11/26/86 14 days	12/03/86 16 days	12/03/86 16 days	12/03/86 16 days	11/26/86 13 days	11/26/86 12 days	11/26/86 12 days	12/03/86 16 days
Arsenic Date Analyzed Elapsed Time	EPA 3050/7060										
Ba, Cd, Cr, Pb, Ag Date Analyzed Elapsed Time	EPA 3050/6010/200.7										
Mercury Date Analyzed Elapsed Time	EPA 7471										

EPA 3050/7740

Selenium Date Analyzed Elapsed Time

LATACHEM ANALYTICAL REPORT Duluth IAP ~ Soil Samples Holding Time Summary

			GW2-E				B3-A	83-A	83-A	83-8	83-B
		Field #:	15-16,5	SS-2A	SS-2B	SS-2C	0-1-5	2.5-4	5-6.5	6-1-5	2.5-4
Parameter	Method	Site :	OM	TW0	TWO	TWO	THREE	THE	THREE	THEE	¥
SAMPLING DATE			11/11/86	11/22/86	11/22/86	11/22/86	11/25/86	11/25/86	11/25/86	11/25/86	11/25/86
Oil & Grease Date Analyzed Elapsed Time	EPA 413,2		12/08/86 21 days	12/09/86 17 days	12/09/86 17 days	12/09/86 17 days	12/26/86 31 days				
Phenolics Date Analyzed Elapsed Time	EPA 420,2		12/03/86 16 days	12/03/86 11 days	12/03/86 11 days	12/03/86 11 days	12/08/86 13 days				
Arsenic Date Analyzed Elapsed Time	EPA 3050/7060						12/11/86 16 days				
Ba, Cd, Cr, Pb, Ag Date Analyzed Elapsed Time	EPA 3050/6010/200.7						12/09/86 14 days				
Mercury Date Analyzed Elapsed Time	EPA 7471						12/13/86 18 days				
Selenium Date Analyzed Elapsed Time	EPA 3050/7740						12/11/86 16 days				

DATACHBA ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

6W3-U 5-6,5 SS-3A THREE THREE		-	_	2 4	12/13/86 12/04/86 11 days* 12 days	12/14/86 12/04/86 12 days* 12 days
6M3-B 5-6,5 THREE		12/11/86 1; 9 days*	12/13/86 12	01/07/87 01 36 days* 36	12/13/86 12 11 days* 11	12/14/86 12/ 12 days* 12
GW3-A 5-6.5 THREE 11/26/86*	12/26/86 30 days*	12/08/86 12 days*	12/11/86 15 days*	12/09/86 13 days*	12/13/86 17 days*	12/11/86 15 days*
B3-C 5-6.5 THREE 12/01/86	12/30/86 29 days	12/11/86 10 days	12/13/86 12 days	01/07/87 37 days	12/13/86 12 days	12/14/86 13 days
B3-C 5-6.5 THREE 11/25/86	12/26/86 31 days	12/08/86 13 days	12/11/86 16 days	12/09/86 14 days	12/13/86 18 days	12/11/86 16 days
B3-C 2.5-4 THREE 11/25/86	12/26/86 31 days	12/08/86 13 days	12/11/86 16 days	12/09/86 14 days	12/13/86 18 days	12/1 1/86 16 days
B3-C 0-1.5 THREE 11/25/86	12/26/86 31 days	12/08/86 13 days	12/11/86 16 days	12/09/86 14 days	12/13/86 18 days	12/1 1/86 16 days
B3-8 5-6.5 THREE 11/25/86	12/26/86 31 days	12/08/86 13 days	12/11/86 16 days	12/09/86 14 days	12/13/86 18 days	12/11/86 16 days
Field #: Site :						
Me thod	EPA 413,2	EPA 420,2	EPA 3050/7060	EPA 3050/6010/200.7	EPA 7471 EPA 3050/7740	
Parameter SAMPLING DATE	Oil & Greese Date Analyzed Elepsed Time	Phenolics Date Analyzed Elapsed Time	Arsenic Date Analyzed Elapsed Time	Ba, Cd, Gr, Pb, Ag Date Analyzed Elaps ed Time	Mercury Date Analyzed Elapsed Time Selenium	Date Analyzed Elapsed Time

DATACHBA AMALYTICAL REPORT Duluth IAP - Soil Samples Holding Time Summary

					B4-A	B4-A	B4-A	8 4 -8	84-B	B4-B
Parameter	Me thod	Field #: Site :	SS-38 THREE	SS-3C THREE	2.5.4 FOUR	5-6.5 FOUR	7.5-9 FOUR	2,5-4 FOUR	5-6.5 FOUR	7.5-11.5 FOUR
SAMPLING DATE			11/22/86	11/22/86	12/02/86	12/02/86	12/02/86	12/02/86	12/02/86	12/02/86
Oil & Greese Date Analyzed Elapsed Time	EPA 413.2		12/09/86 17 days	12/09/86 17 days	12/30/86 28 days					
Phenolics Date Analyzed Elapsed Time	EPA 420.2		12/03/86 11 days	12/03/86 11 days						
Arsenic Date Analyzed Elapsed Time	EPA 3050/7060		12/04/86 12 days	12/04/86 12 days						
Ba, Cd, Cr, Pb, Ag Date Analyzed Elapsed Time	EPA 3050/6010/200,7		01/05/87 44 days	01/05/87 44 days						
Mercury Date Analyzed Elapsed Time	EPA 7471		12/04/86 12 days	12/04/86 12 days						
Selenium Date Analyzed Elapsed Time	EPA 3050/7740		12/04/86 12 days	12/04/86 12 days						

DATACHEM ANALYTICAL REPORT Duluth IAP - Soll Semples Holding Time Summary

Parameter SAMPLING DATE	Me thod	Field #: Site :	84-C 2.5-4 FOUR 12/04/86	84-C 5-6.5 FOUR 12/04/86	1.5-9 FOUR 12/04/86	2.5-4 FOUR 12/04/86	84-D 5-6.5 FOUR 12/04/86	B4-D 7,5-9 FOUR 12/04/86	2.5-4 FOUR 12/05/86	5-6.5 FOUR 12/05/86	GW4-A 10-11.5 FOUR 12/02/86
Oil & Grease Date Analyzed Elapsed Time	EPA 413.2		12/31/86 27 days	12/31/86 27 days	12/31/86 27 days	12/31/86 27 days	12/31/86 27 days	12/31/86 27 days	12/31/86 26 days	12/31/86 26 days	12/30/86 28 days
Phenolics Date Analyzed Elapsed Time	EPA 420.2										

EPA 3050/7060 Arsenic Date Analyzed Elapsed Time

EPA 3050/6010/200,7 Ba, Cd, Cr, Pb, Ag Date Analyzed Elapsed Time

Mercury Date Analyzed Elapsed Time

EPA 7471

Date Analyzed Elapsed Time Selenium

EPA 3050/7740

DATACHEN ANALYTICAL REPORT Duluth IAP - Soil Samples Holding Time Summary

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SS-4D 5-6.5 9.5-11 FOUR FIVE FIVE 11/23/86 11/21/86 11/21/86	12/18/86	12/04/86	13 days 13 days 12/09/86 12/09/86	18 days 18 days 01/12/87		13 days 13 days
SS-4C SS FOUR FG	12/09/86 12/0 16 days 16					
SS-4B FOUR 11/23/86	12/09/86 16 days					
55-4A FOUR 11/23/86	12/09/86 16 days					
GW4-D 5-6.5 FOUR 12/03/86	12/30/86 27 days					
GW4-C 10-12 FOUR 12/03/86	12/30/86 27 days					
GW4-B 5-6.5 FOUR	12/30/86 27 days					
Field #: Site :						
Me thod	EPA 413.2	EPA 420.2	EPA 3050/7060	EPA 3050/6010/200.7	EPA 7471	EPA 3050/7740
Perameter SAMPLING DATE	011 & Greese Date Analyzed Elapsed Time	Phenolics Date Analyzed Elapsed Time	Arsenic Date Analyzed Elapsed Time	Ba, Cd, Cr, Pb, Ag Date Analyzed Elapsed Time	Mercury Date Analyzed Elapsed Time	Selenium

12/09/86 18 days

12/09/86 18 days

Elapsed Time

Duluth IAP - Soil Samples Holding Time Summary

GW5-C Floid #: 10-11.5 SS-5A SS-5B SS-5C SS-5D SS-5E 0-1.5 2.5-4 0-1.5 SITH : FIVE FIVE FIVE FIVE SIX SIX II/22/86 II/22/86 II/22/86 II/18/86 II/18/86 II/18/86 II/18/86	12/18/86 12/18/86 12/18/86 12/18/86 12/18/86 12/18/86 12/05/86 12/05/86 12/05/86 2/05/86 2/05/86 2/05/86 2/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86 12/05/86	12/04/86 12/04/86 12/04/86 12/04/86 12/04/86 12 days 12 days 12 days 12 days 12 days 12 days	12/09/86 12/09/86 12/09/86 12/09/86 12/09/86 12/09/86 17 days 17 days 17 days 17 days 17 days	5,7 01/12/87 01/12/87 01/12/87 01/12/87 01/12/87 01/12/87 51 days 51 days 51 days 51 days	12/04/86 12/04/86 12/04/86 12/04/86 12/04/86 12 days 12 days 12 days 12 days 12 days	12/09/86 12/09/86 12/09/86 12/09/86 12/09/86
Me thod	EPA 413.2	EPA 420.2	EPA 3050/7060	EPA 3050/6010/200.7	EPA 7471	EPA 3050/7740
Parameter SAMPLING DATE	Oii & Greese Date Analyzed Elapsed Time	Phenoilcs Date Analyzed Elapsed Time	Arsenic Date Analyzed Elapsed Time	Ba, Cd, Cr, Pb, Ag Date Analyzed Elapsed Time	Mercury Date Analyzed Elapsed Time	Selentum Date Analyzed

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DATACHBA ANALYTICAL REPORT Duluth 1AP - Soil Samples Holding Time Summary

SAMPLING DATE OII & Grease Date Analyzed Elapsed Time Phenolics Date Analyzed Elapsed Time Arsenic Date Analyzed Elapsed Time Arsenic Date Analyzed Elapsed Time	Me thod EPA 413,2 EPA 420,2 EPA 3050/6010/200,7	Si +e	2,54 2,54 SIX 11/18/86 12/05/86 17 days	11/24/86 11/24/86 12/18/86 24 days 12/10/86 16 days 12/13/86 20 days	B7-A 2,5-4 SEVEN 11/24/86 12/18/86 24 days 12/10/86 16 days 12/13/86 20 days	11/24/86 11/24/86 12/18/86 24 days 12/10/86 16 days 12/13/86 20 days	2.5.4 SEVEN 11/24/86 12/18/86 24 days 12/10/86 16 days 12/13/86 19 days 10 days	GW7-A 10-11.5 SEVEN 11/23/86 12/18/86 25 days 12/03/86 10 days 12/09/86 16 days 19 days	GW7-B 10-11,5 SEVEN 11/23/86 12/18/86 25 days 12/03/86 10 days 12/09/86 16 days 19 days	15-16.5 SEVEN 11/24/86 12/18/86 24 days 12/10/86 16 days 12/13/86 19 days 10 days	SS-7A* SEVEN 11/24/86 12/19/86 25 days 12/10/86 16 days 12/13/86 19 days 44 days
Marcury Date Analyzad Elapsed Time Selenium Date Analyzad Elapsed Time	EPA 7471 BPA 3050/7740			12/04/86 10 days 12/14/86 20 days	12/04/86 10 days 12/14/86 20 days	12/04/86 10 days 12/14/86 20 days	12/04/86 10 days 12/14/86 20 days	12/04/86 11 days 12/09/86 16 days	12/04/86 11 days 12/09/86 16 days	12/04/86 10 days 12/14/86 20 days	12/13/86 20 days 12/14/86 20 days

DATACHEA ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

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		* * * * * * * * * * * * * * * * * * * *	R8−A	H8A	¥-8€.	88 88	B8-8B	B8-B	GW8 -A	GW8-B	GW8-C
		F 6 4	0-1-5	2.54	5-6.5	0-1-5	2.5-4	5-6.5	5-6-5	10-11.5	10-11.5
Por case to	Me thod	Site :	EGAT	EIGHT	EIGHT	EGHT	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT
SAMPLING DATE			12/05/86	12/05/86	12/05/86	12/06/86	12/06/86	12/06/86	12/06/86	12/06/86	12/01/86
Oil & Grease Date Analyzed	EPA 413.2		01/02/87	78/20/10	78760710	01/00/87	19700710	F0700710	,		
Elapsed Time			28 days	28 days	28 days	27 days	27 days	27 days	01/02/87 27 days	01/02/87 27 days	01/02/87 26 days
Phenolics Date Analyzed	EPA 420.2		12/24/86	12/24/86	12/24/86	12/24/86	13/34/86	20/10/01		9	
Elapsed Time			19 days	19 days	19 days	18 days	12/24/80 18 days	12/24/86 18 days	12/24/86 18 days	12/24/86 18 days	12/31/86 24 days
Arsenic	EPA 3050/7060										
Date Analyzed			12/23/86	12/23/86	12/23/86	12/23/86	12/23/86	12/23/86	12/23/86	12/23/86	12/23/86
emil pasdola			18 days	18 days	18 days	17 days	16 days				
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7										
Flanced Time			01/07/87	01/07/87	01/07/87	01/07/87	01/07/87	01/07/87	01/07/87	01/01/87	01/05/87
			oo days	55 days	55 days	52 days	32 days	32 days	32 days	32 days	29 days
Mercury	EPA 7471										
Date Analyzed			12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/22/86
ciapsed ime			19 days	19 days	19 days	19 days	18 days	18 days	18 days	18 days	15 days
Selenium	EPA 3050/7740										
Date Analyzed Elapsed Time			12/29/86 24 days	12/29/86 24 days	12/29/86 24 days	12/29/86 23 days	12/29/86 22 days				

Duluth IAP - Soll Samples Holding Time Summary

		Fleid #:	SS-8A*	SS-86*	
Par ameter	Mathod	Site :	EI GH	EIGHT	
SAMPLING DATE			11/25/86*	11/25/86*	
OII & Grease	EPA 413.2				
Dete Analyzed Elapsed Time			12/19/86 24 days*	12/19/86 24 days*	
Phenotics	EPA 420.2		20101161	20101761	
Elapsed Time			15 days*	15 days*	
Arsenic Dete Analyzed	EPA 3050/7060		12/13/86	12/13/86	
Elapsed Time			18 days*	18 days*	
Ba, Cd, Cr, Pb, Ag Date Analyzed	EPA 3050/6010/200.7		01/07/87	01/07/87	
Elapsed Time			43 days*	43 days*	
Mercury Date Analyzed	EPA 7471		12/13/86	12/13/86	
Etapsed Time			18 days*	18 days*	
Sel en lum	EPA 3050/7740				
Libre Analyzed			12/14/86 19 days*	12/14/86 19 days*	

^{*} Revised 07/10/87

DATACHBA ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Ethylene Glycol Date Analyzed Elapsed Time Ignitability Date Analyzed Elapsed Time EP Tox Extraction Date Extraction Date Extracted Elapsed Time Arsenic Date Analyzed Elapsed Time Arsenic Date Analyzed Elapsed Time Barium Date Analyzed Elapsed Time	He thod P&CAM 338 P&CAM 338 EPA 1010 EPA 7060 EPA 7080	Field #:	DRUM 421 12/01/86 112/12/86 11 days 12/10/86 9 days 12/16/86 6 days 7 days	DRUM 422 THREE 12/01/86 11 days 12/10/86 9 days 12/16/86 6 days 7 days	0-2.5 462 FOUR 12/12/86 7 days 12/13/86 8 days 12/16/86 3 days 12/17/86 4 days	0-2.5 459 E1GHT 12/12/86 7 days 12/13/86 8 days 12/16/86 3 days 12/17/86 4 days	GW-8C DRUM E.I.G-IT 12/26/86 19 days 12/17/86 10 days 12/23/86 6 days 12/30/86 13 days	Bo-A 0-1.5 SIX 11/18/86 11/26/86 6 days	86-A 2.5-4 SIX 11/18/86 11/26/86 6 days	86-8 0-1.5 SIX 11/18/86 11/26/86 6 days	B6-B 2.5-4 SIX 11/18/86 11/26/86 6 days
Cedmium Date Analyzed Elapsed Time	EPA 7130		12/17/86 7 days	12/17/86 7 days	12/17/86 4 days	12/17/86 4 days	12/30/86 13 days				

DATACHBA AMALYTICAL REPORT Duiuth IAP - Soil Samples Holding Time Summary

			SE SE	DRUM	0-2.5	0-2.5	0.8−80 0.80
		Field #:	421	422	462	459	DRUM
Parameter	Me+hod	Site :	ONL	THREE	FOUR	EI GHT	EI GHT
SAMPLING DATE			12/01/86	12/01/86	12/05/86	12/05/86	12/01/86
Chromium Date Analyzad	EPA 7190		12/11/86	12/11/86	12/17/86	12/11/86	12/27/86
Elapsed Time			7 days	7 days	4 days	4 days	10 days
Pead	EPA 7421						
Date Anal yzed El apsed Time			12/17/86 7 days	12/17/86 7 days	12/17/86 4 days	12/17/86 4 days	12/22/86 5 days
Mercury	EPA 7470		78/ 21/61	70/11/61	79/11/61	13/11/86	36/86/61
Date Analyzed Elapsed Time			12/11/86 7 days	7 days	4 days	4 days	7 days
Selenium Date Analyzad	EPA 7740		12/16/86	12/16/86	12/16/86	12/16/86	12/29/86
Elapsed Time			6 days	6 days	3 days	3 days	22 days
SIIver	EPA 7760						
Date Analyzed			12/11/86	12/17/86	12/11/86	12/17/86	12/30/86
Elapsed Time			7 days	7 days	4 days	4 days	13 days

Duluth IAP - Water Samples Holding Time Summary

•		Field #:	GW1-A	OW1-C	GW 1-D	GW1-E	SW-1A	SW-18	GW2-A	GW2-B	GW2-C
Parameter	Method	Site :	ONE	ONE	ONE	ONE	S	ONE	<u> </u>	TWO	DML
SAMPLING DATE			12/10/86	12/11/86	12/15/86	12/15/86	11/23/86	11/23/86	01/01/87	01/02/87	01/02/87
Purgeable Halocarbons	EPA 601			1			,				
Elapsed Time			7 days	12/11/86 6 days	12/25/86 8 days	12/25/86 8 days	12/06/86 13 days	12/06/86 13 days	01/12/87 11 days	01/12/87 10 days	01/12/87 10 days
Purgeable Aromatics	EPA 602										
Date Analyzed			12/11/86	12/11/86	12/23/86	12/23/86	12/06/86	12/06/86	01/12/87	01/12/87	01/12/87
Elapsed Time			7 days	7 days	8 days	8 days	13 days	13 days	11 days	10 days	10 days
Pesticides/PCBs	EPA 608										
Date Extracted			12/11/86	12/11/86	12/20/86	12/20/86	11/29/86	11/29/86			
Elapsed Time			7 days	6 days	5 days	5 days	6 days	6 days			
Date Analyzed			01/08/87	01/08/87	01/08/87	01/08/87	12/02/86	12/02/86			
Etapsed Time			22 days	22 days	19 days	19 days	3 days	3 days			
Herbicides	EPA 615										
Date Extracted			12/11/86	12/11/86	12/20/86	12/20/86	11/29/86	11/29/86			
Elapsed Time			7 days	6 days	5 days	5 days	6 days	6 days			
Date Analyzed			01/13/87	01/13/87	01/13/87	01/13/87	12/11/86	12/16/86			
Elapsed Time			4 days	4 days	24 days	24 days	18 days	17 days			
Oil and Grease	EPA 413.2										
Date Analyzed			01/06/87	01/06/87	01/13/87	01/13/87	12/10/86	12/10/86	01/22/87	01/22/67	01/22/87
Elapsed line			27 days	26 days	29 days	29 days	17 days	17 days	21 days	20 days	20 days

Duluth IAP - Water Samples Holding Time Summary

Parameter	Method	Fleid #: Site :	GW2-D TWO	GW2-E TWO	SW-2A TWO	SW-28 TWO	SW-2C TWO	MW-1 TWO	MM-2 TWO	MM-4 TWO	MW-5 TWO
SAMPLING DATE			01/02/87	01/03/87*	11/22/86	11/22/86	11/22/86	01/03/87	01/03/87	01/04/87	01/04/87
Purgeable Helocarbons Date Analyzed Elapsed Time	EPA 601		01/12/87 10 days	01/12/87 9 days*	12/04/86 12 days	12/04/86 12 days	12/04/86 12 days	01/12/87 9 days	01/12/87 9 days	01/15/87 9 days	01/13/87 9 days
Purgeable Arcmatics Date Analyzed Elapsed Time	EPA 602		01/12/87 10 days	01/12/87 9 days*	12/04/86 12 days	12/04/86 12 days	12/04/86 12 days	01/12/87 9 days	01/12/87 9 days	01/13/87 8 days	01/13/87 8 days
Pesticides/PCBs Date Extracted Elapsed Time Date Analyzed Elapsed Time	6PA 608										
Herbicides Date Extracted Elapsed Time Date Analyzed Elapsed Time	EPA 615										
Oil and Grease Date Analyzed Elapsed Time	EPA 413.2		01/22/87 20 days	01/22/87 19 days*	12/10/86 18 days	12/10/86 18 days	12/10/86 18 days	01/22/87 19 days	01/22/87 19 days	01/22/87 18 days	01/22/87 18 days

* Revised 07/10/87

DATACHEN ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

		Field #:	9-MW	MW-7	GW3-A	GW3-8	GW3-C	GW3-D	SW-3A	SW-3B	SW-3C
Parameter	Method	Site :	TWO	TWO	THREE						
SAMPLING DATE			01/04/87	01/01/87	01/06/87	01/06/87	01/06/87	01/07/87	11/22/86	11/22/86	11/22/86
Purgeable Halocarbons Date Analyzed	EPA 601		01/13/87	01/13/87	01/13/87	01/13/87	01/13/87	01/13/87	11/28/86	11/28/86	11/28/86
Elapsed Time			9 days	6 days	7 days	7 days	7 days	6 days	e days	6 days	6 days
Purgeable Archatics Date Analyzed	EPA 602		01/13/87	01/13/87	01/13/87	01/13/87	01/13/87	01/14/87	11/28/86	11/28/86	11/28/86
Elapsed Time			9 days	6 days	7 days	7 days	7 days	7 days	6 days	6 days	6 days
Pesticides/PCBs Date Extracted	EPA 608				01/13/87	01/13/87	01/13/87	01/12/87	11/29/86	11/29/86	11/29/86
Elapsed Time					7 days	7 days	7 days	5 days	7 days	7 days	7 days
Date Analyzed					01/16/86	01/16/86	01/16/86	01/16/86	12/02/86	12/02/86	12/02/86
Elapsed Time					3 days	3 days	3 days	4 days	3 days	3 days	3 days
Herbi cides	EPA 615										
Date Extracted					01/12/87	01/12/87	01/12/87	01/12/87	11/29/86	11/29/86	11/29/86
Elapsed Time					6 days	6 days	6 days	5 days	7 days	7 days	7 days
Date Analyzed					01/19/87	01/19/87	01/19/87	01/19/87	12/11/86	12/17/86	12/11/86
Elapsed Time					7 days	7 days	7 days	7 days	18 days	18 days	18 days
Oil and Grease	EPA 413.2										
Date Analyzed			01/22/87	01/26/87	01/22/87	01/22/87	01/22/87	01/26/87	12/10/86	12/10/86	12/10/86
Elapsed Time			18 days	21 days	16 days	16 days	16 days	19 days	12 days	12 days	12 days

DATACHEM ANALYTICAL REPORT Duluth IAP - Water Samples Holding Time Summary

		Field #:	GW4-A	G#4-B	GW4-C	GW4-D	SW-4A	SW-48	SW-4C	SW-4D	₩88
Parameter	Method	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOGR	FOUR	FOUR
SAMPLING DATE			12/18/86	12/19/86	12/19/86	12/19/86	11/23/86	11/23/86	11/23/86	11/23/86	12/20/86
Purgeable Halocarbons Date Analyzed Elapsed Time	EPA 601		12/23/86 5 days	12/29/86 10 days	12/29/86 10 days	12/29/86 10 days	12/03/86 10 days	12/03/86 10 days	12/03/86 10 days	12/03/86 10 days	12/29/86 9 days
Purgeable Arcmatics Date Analyzed Elapsed Time	EPA 602		12/23/86 5 days	12/30/86 11 days	12/30/86 11 days	12/30/86 11 days	12/03/86 10 days	12/03/86 10 days	12/03/86 10 days	12/03/86 10 days	12/30/86 10 days
Pesticides/PCBs Date Extracted Elapsed Time Date Analyzed Elapsed Time	€₽∧ 608										
Herbicides Date Extracted Elapsed Time Date Analyzed Elapsed Time	EP∧ 615										
Oif and Grease Date Analyzed Elapsed Time	EPA 413.2		01/13/87 26 days	01/16/87 28 days	01/16/87 28 days	01/16/87 28 days		12/18/86 25 days	12/18/86 25 days	12/18/86 25 days	01/16/87 27 days

DATACHEN ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

		Fib. 4.	C-790	OT-1	MW. 1	A.S.	d A	C 1	A 2	Cwl	J\$ - P#3
Parameter	Method	Si te ::	FOUR	FOUR	FOUR	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE
SAMPLING DATE			12/20/86	12/20/86	12/20/86	12/17/86	12/16/86*	12/16/86*	11/22/86	11/22/86	11/22/86
Purgeable Halocarbons Date Analyzed Elapsed Time	EPA 60		12/29/86 9 days	12/29/86 9 days	12/29/86 9 days	12/23/86 6 days	12/23/86 7 days*	12/23/86 7 days*	12/06/86 14 days	12/06/86 14 days	12/06/86 14 days
Purgeable Arcmatics Date Analyzed Elapsed Time	EPA 602		12/30/86 10 days	12/30/86 10 days	12/30/86 10 days	12/23/86 6 days	12/23/86 7 days*	12/23/86 7 days*	12/06/86 14 days	12/06/86 14 days	12/06/86 14 days
Pesticides/PCBs Date Extracted Elapsed Time Date Analyzed Elapsed Time	EPA 608					12/24/86 7 days 01/08/87 13 days	12/24/86 8 days* 01/08/87 14 days*	12/24/86 8 days* 01/08/87 14 days*	11/29/86 7 days 12/02/86 3 days	11/29/86 7 days 12/02/86 3 days	11/29/86 7 days 12/02/86 3 days
Herbicides Date Extracted Elapsed Time Date Analyzed Elapsed Time	EPA 615					12/22/86 5 days 01/13/87 22 days	12/22/86 6 days* 01/13/87 23 days*	12/22/86 6 days* 01/13/87 23 days*	11/29/86 7 days 12/17/86 18 days	11/29/86 7 days 12/17/86 18 days	11/29/86 7 days 12/17/86 18 days
Oll and Grease Date Analyzed Elapsed Time	EPA 413.2		01/16/87 27 days	01/16/87 27 days	01/16/87 27 days	01/12/87 26 days	01/12/87 27 days*	01/12/87 27 days*	12/10/86 18 days	12/10/86 18 days	12/10/86 18 days

* Revised 07/10/87

DWIACHEN MARLYTICAL REPORT Duluth IAP - Water Samples Holding Time Summary

SM-8B E1 GHT 11/25/86	12/06/86 11 days	12/06/86 11 days	12/02/86 7 days 12/14/86 12 days	12/02/86 7 days 12/16/86 14 days	12/23/86 28 days
SW-8A E1 GHT 11/25/86	12/06/86 11 days	12/06/86 11 days	12/02/86 7 days 12/14/86 12 days	12/02/86 7 days 12/16/86 14 days	12/23/86 28 days
GM8-C E1 GHT 01/09/87	01/20/87 11 days	01/20/87 11 days	01/13/87 4 days 01/16/87 3 days	01/13/87 4 days 01/19/87 7 days	01/26/87 17 days
GW8-8 E1GHT 01/07/87	01/14/87 7 days	01/14/87 7 days	01/12/87 5 days 01/16/87 4 days	01/12/87 5 days 01/19/87 7 days	01/26/87 19 days
GW8-A E1GHT 01/09/87	01/20/87 11 days	01/20/87 11 days	01/13/87 4 days 01/16/87 3 days	01/13/87 4 days 01/19/87 6 days	01/26/87 17 days
SM-7A SEVEN 11/24/86	12/06/86 12 days	12/06/86 12 days	12/01/86 7 days 12/14/86 13 days		12/23/86 29 days
GM7-C SEVEN 12/19/86*	12/29/86 10 days*	12/29/86 10 days*	12/26/86 7 days* 01/08/87 13 days*	12/26/86 7 days* 01/14/87 20 days*	01/09/87 21 days*
GW7-8 SEVEN 12/18/86	12/23/86 5 days	12/23/86 5 days	12/23/86 5 days 01/08/87 16 days	12/22/86 4 days 01/13/87 22 days	01/13/87 26 days
GW7 -A SE VEN 12/17/86	12/23/86 6 days	12/23/86 6 days	12/24/86 5 days 01/08/87 15 days	12/22/86 5 days 01/13/87 22 days	01/13/87 27 days
Field #: Site :					
Method	EPA 601	EPA 602	EPA 608	EPA 615	EPA 413.2
Parameter SAMPLING DATE	Purgeable Halocarbons Dete Analyzed Elepsed Time	Purgeable Arcmetics Date Analyzed Elapsed Time	Pesticides/PCBs Date Extracted Elapsed Time Date Analyzed Elapsed Time	Herbicides Date Extracted Elapsed Time Date Analyzed Elapsed Time	Oli and Grease Date Analyzed Elapsed Time

* Rev I sed 07/10/87

DATACHEM AMALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

	7 12/23/86 12/19/86 01/12/87 01/07/87 (*) (*) (*)	EPA 601 12/31/86 12/29/86 01/21/87 01/14/87 8 days 10 days 9 days 7 days	EPA 602 12/29/87 01/21/87 12/23/86 10 days 9 days 6 days	EPA 608 12/17/86 12/24/86 2 days 5 days 01/08/87 01/08/87 22 days 15 days	EPA 615 12/17/87 01/12/87 2 days 5 days 01/13/87 01/13/87 27 days 7 days 6 days	EPA 413,2 01/20/87
Per amoter	SAMPLING DATE	Purgeable Halocarbons Date Analyzed Elapsed Time	Purgeable Arcmatics Date Analyzed Elapsed Time	Pesticides/PCBs Date Extracted Elapsed Time Date Analyzed Elapsed Time	Herbicides Date Extracted Elapsed Time Date Analyzed Elapsed Time	Oil and Grease Date Analyzed

^(*) Date sample received by DataChem.

DATACHEM MMLYTICAL REPORT Duluth IAP - Water Samples Holding Time Summary

Per anoter	Method	Fleid #:	GW1-A ONE 12/10/86	GM1-C ONE 12/11/86	GW1-D ONE 12/15/86	GW1-E ONE 12/15/86	SM-1A ONE 11/23/86	SW-1B ONE 11/23/86	GW2-A TWO 01/01/87	GW2-B TW0 01/02/87	GW2-C TWO 01/02/87
Phenolics Date Analyzed Elapsed Time	EPA 420.2		12/24/86 14 days	12/24/86 13 days	01/07/87 23 days	01/07/87 23 days	12/04/86 11 days	12/04/86 11 days	01/14/87 13 days	01/14/87 12 days	01/14/87 12 days
Arsenic Date Analyzad Elapsed Time	EPA 206.2		12/23/86 13 days	12/23/86 12 days	01/12/87 28 days	01/12/87 28 days	12/23/86 20 days	12/13/86 20 days			
Barlum Date Analyzed Elapsed Time	EPA 208.1		12/30/86 20 days	12/30/86 19 days	01/15/87 31 days	01/15/87 31 days	12/03/86 10 days	12/03/86 10 days			
Cadmium Date Analyzed Elapsed Time	EPA 213.1		12/30/86 20 days	12/30/86 19 days	01/09/87 25 days	01/09/87 25 days	12/03/86 10 days	12/03/86 10 days			
Chrostius Date Analyzed Etapsed Time	EPA 218.1		12/27/86 17 days	12/27/86 16 days	01/15/87 31 days	01/15/87 31 days	12/03/86 10 days	12/03/86 10 days			
Lead Date Analyzed Elapsed Time	EPA 239.2		12/22/86 12 days	12/22/86 11 days	01/10/87 26 days	01/10/87 26 days	12/16/86 23 days	12/16/86 23 days			

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Duluth IAP - Water Samples Holding Time Summary

9	1		GW2-D	GW2-E	SW-2A	SW-2B	SW-2C	MM1	MM-2	MM-4	MM-5
	Method	Si te ::	2	2	2	E	<u> </u>	<u></u>	OMT OM	O#L	TWO
SAMPLING DATE			01/02/87	01/03/87*	11/22/86	11/22/86	11/22/86	01/03/87	01/03/87	01/04/87	01/04/87
Phenolics Date Analyzed	EPA 420.2		01/14/87	01/14/87	12/04/86	12/04/86	12/04/86	01/14/87	01/14/87	01714/87	01/14/87
Elapsed Time			12 days	11 days*	12 days	12 days	12 days	11 days	11 days	10 days	10 days
Arsenic	EPA 206.2										
Date Analyzed Elapsed Time											
Barium	EPA 208.1										
Date Analyzed											
e in best in											
Cadmium Date Anglyzed	EPA 213.1										
Elapsed Time											
Chromium	EPA 218.1										
Date Analyzed											
Elapsed Time											
Lead	EPA 239.2										
Date Analyzed											
Elapsed lime											

* Revised 07/10/87

DATACHBA AMALYTICAL REPORT Duluth IAP - Water Samples Holding Time Summary

		Fleid #:	9-MM	MM-7	GW3-A	GW3-B	GW3-C	GW3-D	SH-3A	SW-38	SE-3C
Par ameter	Method	Site :	OMT	9	THREE	THREE	THREE	THEE	THREE	THREE	THREE
SAMPLING DATE			01/04/87	01/07/87	01/06/87	01/06/87	01/06/87	01/07/87	11/22/86	11/22/86	11/22/86
Phenolics Date Analyzad Elapsed Time	EPA 4202		01/14/87 10 days	01/20/87 13 days	01/16/87 10 days	01/16/87 10 days	01/16/87 10 days	01/22/87 15 days	12/04/86 12 days	12/04/86 12 days	12/04/86 12 days
Arsenic Date Analyzed Elapsed Time	EPA 206.2				01/21/87 15 days	01/21/87 15 days	01/21/87 15 days	01/21/87 14 days	12/13/86 21 days	12/13/86 21 days	12/13/86 21 days
Barium Date Analyzed Elapsed Time	EPA 208,1				01/20/87 14 days	01/20/87 14 days	01/20/87 14 days	01/20/87 13 days	12/03/86 II days	12/03/86 11 days	12/03/86 11 days
Cadmium Date Analyzed Elapsed Time	EPA 213.1				01/20/87 14 days	01/20/87 14 days	01/20/87 14 days	01/20/87 13 days	12/03/86 11 days	12/03/86 11 days	12/03/86 11 days
Chromium Date Analyzed Elapsed Time	EPA 218.1				01/20/87 14 days	01/20/87 14 days	01/20/87 14 days	01/20/87 13 days	12/03/86 11 days	12/03/86 11 days	12/03/86 11 days
Lead Date Analyzed Elapsed Time	EPA 239,2				01/21/87 15 days	01/21/87 15 days	01/21/87 15 days	01/21/87 14 days	12/16/86 24 days	12/16/86 24 days	12/16/86 24 days

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Par aneter	Method	Fleid #: Site :	GW4-A FOUR	GW4-B FOUR	GW4-C FOUR	GW4-D FOUR	SW-4A FOUR	SW-4B FOUR	SW-4C FOUR	SW-4D FOUR	MM-8 Four
SAMPLING DATE			12/18/86	12/19/86	12/19/86	12/19/86	11/23/86	11/23/86	11/23/86	11/23/86	12/20/86
Phenolics Date Analyzed Elepsed Time	EPA 420.2										
Arsenic Date Analyzed Elapsed Time	EPA 206.2										
Barium Date Analyzed Elapsed Time	BA 208.1										
Cadmium Date Analyzed Elapsed Time	EPA 213,1										
Chromium Date Analyzed Elapsed Time	EPA 218.1										

EPA 239.2

Date Analyzed Elapsed Time

DATACHEN ANALYTICAL REPORT
Duluth IAP - Mater Samples
Holding Time Summary

SW-5A SW-5B SW-5C FIVE FIVE FIVE 11/22/86 11/22/86	12/04/86 12/04/86 12/04/86 12 days 12 days 12 days	12/13/86 12/13/86 12/13/86 21 days 21 days 21 days	12/03/86 12/03/86 12/03/86 11 days 11 days 11 days	12/03/86 12/03/86 12/03/86 11 days 11 days 11 days	12/03/86 12/03/86 12/03/86 11 days 11 days 11 days	12/16/86 12/16/86 12/16/86 24 days 24 days 24 days
GW5-C SW F1VE F1	01/07/87 12/0 22 days* 12	01/12/87 12/ 27 days* 21	01/15/87 30 days*	01/09/87 24 days*	01/15/87 30 days*	01/10/87 25 days*
GW5-8 FIVE 12/16/86*	01/07/87 22 days*	01/12/87 27 days*	01/15/87 30 days*	01/09/87 24 days*	01/15/87 30 days*	01/10/87 25 days*
GW5-A F1VE 12/17/86	01/07/87 21 days	01/12/87 26 days	01/15/87 29 days	01/09/87 23 days	01/15/87 29 days	01/10/87 24 days
FOUR 12/20/86						
FOUR 12/20/86						
FOUR 12/20/86						
Field#:						
Method	EPA 420.2	EPA 206.2	EPA 208.1	EPA 215.1	EPA 218.1	EPA 239.2
Par aneter	Phenolics Date Analyzed Elapsed Time	Arsenic Date Analyzed Elapsed Time	Berium Date Analyzed Elepsed Time	Cadmium Date Analyzed Elansed Time	Chrose luss Date Anal yzed El aos ed Time	Lead Date Analy 20d Elapsed Time

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DATACHBA AMALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

		Fleid #:	GW7-A	G#7-A	GW7 -C	SW-7A	GW8-A	GW8-B	GW8-C	SW-8A	SW-83
Por ane ter	Met hod	Si te :	SEVEN	SEVEN	SEVEN	SEVEN	EI GHT	EI GHT	EI GHT	EI GHT	EIGHT
SAMPLING DATE			12/11/86	12/18/86	12/19/86*	11/24/86	01/09/87	01/07/87	01/09/87	11/25/86*	11/25/86
Phenolics Date Analyzed	EPA 420,2		01/07/87	12/24/86	12/31/86	12/11/86	11/22/87	01/25/87	01/22/87	12/11/86	12/11/86
Elapsed Time			21 days	6 days	12 days*	17 days	13 days	13 days	13 days	16 days*	16 days
Arsenic Date Analyzed	EPA 206.2		01/12/87	01/12/87	01/07/87	12/23/86	01/21/87	01/21/87	01/21/87	12/23/86	12/23/86
Elapsed Time			26 days	25 days	19 days*	29 days	12 days	14 days	12 days	28 days*	28 days
Barium Date Analyzed	EPA 208.1		01/15/87	01/15/87	01/07/87	12/30/86	01/20/87	01/20/87	01/20/87	12/30/86	12/30/86
Elapsed Time			29 days	28 days	19 days*	36 days	11 days	13 days	11 days	35 days*	35 days
Cadmium Date Analyzed	EPA 213,1		01/09/87	01/09/87	01/07/87	12/30/86	01/20/86	01/20/87	01/20/87	12/30/86	12/30/86
Elapsed Time			23 days	22 days	19 days*	35 days	11 days	13 days	11 days	35 days*	35 days
Chromium Date Analyzed	3PA 218.1		01/15/87	01/15/87	01/07/87	12/21/86	01/20/87	01/20/87	01/20/87	12/21/86	12/21/86
Elapsed Time			29 days	28 days	19 days*	33 days	11 days	13 days	11 days	32 days*	32 days
Ped Lead	EPA 239.2										
Date Analyzed Elapsed Time			01/10/87 24 days	01/10/87 23 days	01/07/87 19 days*	12/22/86 28 days	01/21/87 12 days	01/21/87 14 days	01/21/87 12 days	12/22/86 27 days*	12/22/86 27 days

^{*} Revised 07/10/87

DATACHER ANALYTICAL REPORT Duluth 1AP - Water Samples Holding Time Summery

		Field #:	TRIP BLANK THREE	TRIP BLANK SEVEN	TRIP BLANK EIGHT	BALLER RINSE SEVEN
SAMPLING DATE			01/07/87	12/19/86	(*)	(*)
Phenolics Date Analyzed Elapsed Time	EPA 420.2			12/31/86 12 days	01/22/87 10 days	
Arsenic Date Analyzed Elapsed Time	БРА 20 6. 2		01/21/87 14 days			01/07/87 16 days
rium Date Analyzed Elapsed Time	EPA 208.1		01/20/87 13 days			01/07/87 16 days
Cadmium Date Analyzed Elapsed Time	EPA 213.1		01/20/87 13 days			01/06/87 15 days
Chromium Date Analyzed Elapsed Time	EPA 218.1		01/20/87 13 days			01/07/87 16 days
ad Date Analyzed Elapsed Time	₽А 239 . 2		01/21/87 14 days			01/07/87 16 days

(#) Date sample received by DataChem.

DATACHEN AMALYTICAL REPORT Duluth IAP - Water Samples Holding Time Summary

Par amoter SAMPLING DATE	Mercury Dete Analyzed Elapsed Time	Seienium Date Analyzed Elapsed Time	SII ver Date Analyzed
Method	EPA 245J	EPA 270.2	EPA 272.1
Field #: Site :			
GW1-A ONE 12/10/86	12/24/86 14 days	12/29/86 19 days	12/30/86 20 davs
GW1-C ONE 12/11/86	12/24/86 13 days	12/29/86 18 days	12/30/86 19 days
GW1-D ONE 12/15/86	12/23/86 8 days	01/14/87 30 days	01/09/87 25 days
GW1-E ONE 12/15/86	12/23/86 8 days	01/14/87 30 days	01/09/87 25 days
SW-1A ONE 11/23/86	12/04/86 11 days	12/14/86 21 days	12/03/86 10 days
SN-1B ONE 11/23/86	12/04/86 11 days	12/14/86 21 days	12/03/86 10 days
GW2-A TW0 01/01/87			
GW2-8 TW0 01/02/87			
TWO 01/02/87			

DATACHEM AMALYTICAL REPORT Duluth IAP - Water Samples Holding Time Summary

Parameter SAMPLING DATE Mercury	Method EPA 245,J	Fleid #:	TW0-01/04/87	7MM-7 TMO 0/07/87	GW3-A THREE 01/06/87	GW3-B THREE 01/06/87	GM3-C THREE 01/06/87	GM3-D THREE 01/07/87 01/16/87	w 计	SM-3A THREE 11/22/86 12/04/86	SN-3A SN-3B THREE THREE 11/22/86 11/22/86 12/04/86 12/04/86
Elapsed Time	FDA 270.2				3 days			'n	skon !		
Selenium Dete Analyzed Elapsed Time					01/21/87 15 days	01/21/87 15 days	01/21/87 15 days	5 -	/21/8/ 5 days	01/21/8/ 12/14/00 15 days 22 days	
Silver Date Analyzed	BA 272.1				01/20/87 14 days	01/20/87 14 days	01/20/87 14 days	13	01/20/87 13 days	•	-

DATACHBA ANALYTICAL REPORT Duluth IAP - Water Samples Holding Time Summary

Parameter	Met hod	Field#: Site :	MW-9 FOUR	MM-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SM-5A F I VE	SM-5B F IVE	SW-5C FIVE
SAMPLING DATE						12/11/86	12/16/86*	12/16/86*	11/22/86*	11/22/86*	11/22/86*
Mercury	EPA 245.1										
Date Analyzed						12/24/86					12/04/86*
Elapsed lime						7 days	8 days*	8 days*	12 days*	12 days*	12 days*
Sel en lum	EPA 270.2										
Date Analyzed						01/14/86			01/14/86 12/14/86*	12/14/86*	12/14/86*
Etapsed Time						18 days	19 days*	19 days*	22 days*	22 days*	22 days*
Silver	BA 272.1										
Date Analyzed						01/09/87	01/09/87	01/09/87	12/03/86*	12/03/86*	12/03/86*
Elapsed Time						23 days	24 days*	24 days*	11 days*	11 days*	11 days*

^{*} Rev I sed 07/10/87

DUTACHBM AMALYTICAL REPORT Dututh IAP - Water Samples Holding Time Summary

Si te	Method EPA 245,1 EPA 270,2	Field #: Gw7-A Gw7-B Gw7-C Sw-7A Gw8-A Gw8-B Gw8-C Sw-8A Sw-8B Si +e : SEVEN SEVEN EIGHT E	12/23/86 12/23/86 01/06/87 12/04/86 01/16/87 01/16/87 01/16/87 12/04/86 12/04/86 14 days 13 days 18 days* 10 days 7 days 7 days 8 days** 9 days	01/14/87 01/14/87 01/07/87 12/29/86 01/21/87 01/21/87 01/21/87 12/29/86 12/29/86 28 days 27 days 19 days* 35 days 12 days 14 days 12 days 34 days* 34 days	01/09/87
T3	_ ·	SEVEN SEVEN 12/17/86 12/18/86	12/23/86 13 days	01/14/87 27 days	18/90/10 18/60/10 18/60/10

^{*} SM-8A sample for Mercury taken 11/26/86; holding time calculated from this sampling date * Revised 07/10/87

DATACHBA MALYTICAL REPORT Duluth IAP - Water Samples Holding Time Summary

		•	TRIP	RINSE	TRIP	TRIP	BAI LER
Per ane ter	Method	Field #: Site :	BLANK	FIVE	SEVEN	BLANK	SEVEN
SAMPLING DATE			01/08/87	12/19/86	12/29/86	01/07/87	12/22/86 (*)
Mercury Date Analyzed	EPA 245.1		01/16/87 8 dave		12/24/86 5 days	01/09/87 2 days	01/06/87 15 davs
Selentum Date Analyzed	EPA 270.2		01/21/87			<u> </u>	01/07/87
Elapsed lime Silver Date Analyzed Elapsed Time	EPA 272.1		01/20/87				01/06/87 15 days

(*) Date sample received by DataChem.

DATACHBA AMALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summery

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DATACHEN QUALITY CONTROL REPORT
Dulinh IAP - Soll Samples

			Defection		Initial	Spike	Percent	Spl 1+	First	Second	Method
Parameter	Wethod	Units	Limit	Sample	Value	Conc	Recover ed	Sample	Value	Value	Blank
Purgeable Halocarbons	EPA 8010 (*)	6/bn	MD((**)								
Chlorobenzene	EPA 8010	6/6n	0.0018	B2-B 2,5-4	9	0.10	% 16	82-8 2.5-4	2	9	9
				82-C 0-1.5	9	0.10	52%	B2-C 0-1.5	2	₹	
				SS-3A	ð	0.10	75%	SS-3A	2	2	
				B3-B 0-1.5	2	0.10	8 5%	B3-8 0-1,5	9	Q	
				84-A 2.5-4	9	0.10	3 96	B4-A 2.5-4	9	9	
				83-C 5-6.5	9	0.10	94%	83-0 5-6.5	2	Q	
Chloroform	EPA 8010	6/6n	0.0022	82-8 2.5-4	2	0,10	\$ 86	82-8 2.5-4	2	9	9
		i I		82-C 0-1.5	S	0,10	63\$	B2-C 0-1.5	9	오	
				SS-3A	2	0,10	110%	\$S-3A	9	9	
				83-8 0-1,5	2	0.10	% 66	B3-B 0-1.5	9	Q	
				84-A 2.5-4	9	0.10	84%	B4-A 2.5-4	2	2	
				83-C 5-6.5	9	0.10	3 £6	B3-C 5-6.5	9	Q	
1,1-Dichloroethene	EPA 8010	6/6n	0.0025	82-8 2,5-4	9	0.10	3 56	82-8 2,5-4	2	9	2
				82-C 0-1.5	2	0,10	265	B2-C 0-1,5	9	2	
				SS-3A	0,0075	0,10	108%	SS-3A	0.0075	0,0043	
				83-8 0-1.5	9	0.10	88%	83-8 0-1.5	9	Ð	
				84-A 2.5-4	9	0.10	*LL	B4-A 2.5-4	2	2	
				B3-C 5-6.5	9	0.10		83-C 5-6.5	2	QN	
trans-1,2-Dichloroethene	EPA 8010	6/6n	0.0021	83-C 5-6.5	Ş	0.10	846	B3-C 5-6.5	2	2	9
Te trachloroethene	EPA 8010	6/60	0,0019	B2-B 2.5-4	9	0.10		B2-B 2.5-4	9	2	QN
		,		B2-C 0-1.5	9	0.10	218	B2-C 0-1.5	9	9	
				SS-3A	9	0.10	68%	SS-3A	2	Q	
				83-8 0-1.5	ð	0.10	103	83-8 0-1,5	9	9	
					9	•	970	A 3 C A 40	9	9	

(*) Methods documented in previous Analytical Report Section.

(**) MDL values documented in previous Analytical Report Section.

DATACHEN QUALITY CONTROL REPORT
Duluth IAP ~ Soil Samples

Par sensitor	1	<u>.</u>	Detection imit	Spiked	In itial	Spike	Percent	Split	First	Second	Method
10 DE					3	3	10000	Diding	3	3	2
Purgeable Halocarbons (continued)											
1,1,1-Trichloroethane	EPA 8010	6/6n	0,0026	82-8 2.5-4	2	0,10		B2-B 2,5-4	9	9	9
				82-C 0-1.5	9	0.10		82-C 0-1.5	2	운	
				SS-3A	0,0042	0.10	3 26	SS-3A	0,0042	0,0034	
				83-8 0-1.5	2	0.0		83-B 0-1,5	2	S	
				84-A 2.5-4	9	0.10		B4-A 2.5-4	2	9	
				B3-C 5-6.5	2	0.10		B3-C 5-6.5	2	Q	
Tetrach! oroethene	EPA 8010	6/6n	0,0030	82-8 2.5-4	9	0.10		B2-B 2.5-4	2	9	9
				B2-C 0-1.5	2	0.10		B2-C 0-1.5	2	2	
				SS-3A	6600*0	0.10	216	SS-3A	0,0099	0,0059	
				83-8 0-1.5	2	0.10		83-8 0-1,5	9	Ð	
				84-A 2.5-4	9	0,10		B4-A 2.5-4	9	2	
				83-C 5-6.5	2	0.10		B3-C 5-6.5	9	Q	
Purgeble Aromatics	EPA 8020	6/6n	TQ _M								
Benzene	EPA 8020	6/6n	0,0013	82-8 2.5-4	2	0.10		B2-B 2.5-4	9	9	9
				B2-C 0-1.5	2	0.10	478	B2-C 0-1.5	9	S	
				SS-3A	5	0.10		SS-3A	2	9	
				83-8 0-1.5	2	0.10		83-8 0-1,5	2	Q	
				84-A 2.5-4	9	0.10		B4-A 2.5-4	9	2	
				B3-C 5-6.5	2	0.10		B3-C 5-6,5	2	ND.	
Toluene	EPA 8020	6/6n	0,0032	82-8 2,5-4	9	0.10		B2-B 2,5-4	9	9	9
				B2-C 0-1.5	0.54	0.10	32%	82-C 0-1.5	0.54	0,28	
				SS-3A	0.013	0.10		SS-3A	0.013	0.013	
				B3-B 0-1.5	9	0.10		B3-B 0-1.5	9	2	
				84-A 2.5-4	9	0.10		B4-A 2.5-4	2	9	
				83-C 5-6.5	2	0.10		B3-C 5-6,5	2	Q	

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DATACHEN QUALITY CONTROL REPORT Duluth IAP - Soil Samples

Linit Sample Value Conc. Recovered Sample NOL 0,002 B1-A 0-1.5 ND 0,008 B8\$ B3-C 5-6.5 B8-A 5-6.5 ND 0,008 B8\$ B3-C 5-6.5 B8-A 2.5-4 B8-B 0-1.5 ND 0,08 B8\$ B8-A 2.5-4 B8-B 0-1.5 ND 0,08 B8\$ B8-C 11-11.5 B8-B 0-1.5 ND 0,08 B8\$ B8-A 2.5-4 B8-B 0-1.5 ND 0,08 B8\$ B8-A 2.5-4 B8-B 0-1.5 ND 0,08 B8\$ B8-A 2.5-4 B8-B 0-1.5 ND 0,00 0,10 100\$ GMB-C 11-11.5 ND 0,20 95 B8-A 2.5-4 B8-B 0-1.5 ND 0,20 95 B8-A 2.5-4 <				Detection	Spiked	Initial	Spike	Percent	Split	First	Second	Method
Ph 3590/8080	Parameter	Method	Units	Limit	Sample	Value	Conc	Recover ed	Sample	Value	Value	Blank
PA 3550/8080	qes	EPA 3550/8080	6/6n	MOL								
EPA 3550/8080 ug/g 0,003 Bit-A 5-6.5 ND 0,008 Bits Bit-C 11-11.5 ND ND EPA 3550/8080 ug/g 0,003 Bit-A 0-1.5 ND 0,008 Bits Bit-C 5-6.5 ND ND EPA 3550/8080 ug/g 0,004 Bit-A 0-1.5 ND 0,008 Bits Bit-C 5-6.5 ND ND EPA 3550/8080 ug/g 0,004 Bit-A 0-1.5 ND 0,008 Bits Bit-C 5-6.5 ND ND EPA 3550/8080 ug/g 0,004 Bit-A 0-1.5 ND 0,008 Bits Bit-C 5-6.5 ND ND EPA 3550/8080 ug/g 0,004 Bit-A 0-1.5 ND 0,202 Bits Bit-C 5-6.5 ND ND BBH 0 0-1.5 ND 0,002 0,202 0,202 Bits Bit-C 5-6.5 ND ND BBH 0 0-1.5 ND 0,202 0,203 Bits Bits-C 5-6.5 ND ND BBH 0 0-1.5 ND	£.	EPA 3550/8080	b/bn	0,002	B1-A 0-1.5	9	0.08	88\$	83-C 5-6.5	2	9	9
B8-B 0-1,5 NO 0.008 884 GM8-C 11-11,5 NO NO NO NO NO NO NO N					B8-A 5-6,5	9	0.08	88%	88-A 2,5-4	2	웆	
CFA 3550/80080					88-8 0-1,5	9	90.0	88%	GW8-C 11-11,5	9	2	
EPA 3550/8080 ug/g 0,000 BL-A 0-1,5 ND 0,008 885 BL-C 5-6,5 ND ND BPA 3550/8080 ug/g 0,004 BL-A 0-1,5 ND 0,008 887 88-A 25-4 ND ND BPA 3550/8080 ug/g 0,004 BL-A 0-1,5 ND 0,002 0,105 BR-A 25-4 ND ND BPA 3550/8080 ug/g 0,004 BL-A 0-1,5 ND 0,202 0,85 BR-A 25-4 ND ND BPA 3550/8080 ug/g 0,004 BL-A 0-1,5 ND 0,202 0,85 BR-A 25-4 ND ND BPA 3550/8080 ug/g 0,004 BL-A 0-1,5 ND 0,202 0,87 0,86-C 11-11,5 ND ND BPA 5-6,5 ND 0,203 BR-A 5-6,5 ND 0,203 0,87 0,87 0,98 0,90 0,00 BPA 5-6,5 ND 0,203 BR-A 5-6,5 ND 0,203 0,95 0,95 0,96 0,00					GW8-C 11-11.5	9	0.10	\$ 06				
Ba-A 5-6.5 N 0.08 684 BB-A 2.5-4 N N N N N N N N N	908	EPA 3550/8080	6/6n	0,003	B1-A 0-1.5	2	90.0	88	B3-C 5-6.5	2	9	2
EPA 3550/8080 ug/g 0,004 B1-A 0-1,5 ND 0,008 1135 ORB-C 11-11,5 ND ND EPA 3550/8080 ug/g 0,004 B1-A 0-1,5 0,002 0,20 956 B8-C 5-6,5 0,00					BB-A 5-6.5	Ş	0.08	88%	B8-A 2,5-4	9	9	
EPA 3550/8080 ug/g 0,004 B1-A 0-1,5 bits ND 0,10 bits B3-C 5-6,5 bits 0,00 bits B3-C 5-6,5 bits ND 0,20 bits B3-C 5-6,5 bits 0,00 bits B3-C 5-6,5 bits 0,00 bits B3-C 5-6,5 bits 0,00 bits B3-C 5-6,5 bits ND 0,00 bits B3-C 5-6,5 bits ND					B8-B 0-1.5	2	0.08	1138	GW8-C 11-11,5	9	9	
EPA 3550/8080 ug/g 0,004 B1-A 0-1,5 0,002 0,20 845 B3-C 5-6,5 0,00 0,001 EPA 3550/8080 ug/g 0,003 B1-A 0-1,5 ND 0,20 1005 GMB-C 11-11,5 ND ND EPA 3550/8080 ug/g 0,003 B1-A 0-1,5 ND 0,20 1005 GMB-C 11-11,5 ND ND EPA 3550/8080 ug/g 0,005 B1-A 0-1,5 ND 0,20 1005 GMB-C 11-11,5 ND ND EPA 3550/8080 ug/g 0,005 B1-A 0-1,5 ND 0,20 1005 GMB-C 11-11,5 ND ND EPA 3550/8080 ug/g 0,005 B1-A 0-1,5 ND 0,20 1005 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,20 1005 GMB-C 11-11,5 ND 0,20 1005 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,20 1005 GMB-C 11-11,5 ND 0,20 1005 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,005 GMB-C 11-11,5 ND 0,20 1005 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,005 GMB-C 11-11,5 ND 0,20 1005 GMB-C 11-11,5 ND ND GMB-C 11-11,5 ND 0,005 GMB-C 11-11,5 ND 0,005 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND GMB-C 11-11,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND GMB-C 11-11,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND GMB-C 11-11,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND GMB-C 11-11,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 1135 GMB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 MB-C 11-11,5 ND ND BB-A 5-6,5 ND 0,008 MB-C 11					GWB-C 11-11.5	2	0.10	100%				
EPA 3550/8080 ug/g 0,003 81-A 0-1,5 ND 0,20 95% B8-A 2,5-A ND ND B8-B 0-1,5 ND 0,20 100% GNB-C 11-11,5 ND ND GNB-C 11-11,5 ND 0,20 100% GNB-C 11-11,5 ND ND B8-A 5-6,5 ND 0,20 80% B8-A 2,5-A ND 0,20 80% B8-A 2,5-A ND 0,20 80% B8-A 2,5-A ND ND B8-A 2,5-A ND 0,20 100% GNB-C 11-11,5 ND 0,20 100% GNB-C 11-11,5 ND 0,20 100% GNB-C 11-11,5 ND ND B8-B 0-1,5 ND 0,20 100% GNB-C 11-11,5 ND ND B8-B 0-1,5 ND 0,20 100% GNB-C 11-11,5 ND 0,20 11,50 ND 0,20 ND 0,20 11,50 ND 0,20 ND 0,2	-00T	EPA 3550/8080	6/6n	0,004	B1-A 0-1.5	0.002	0,20	84%	83-C 5-6.5	90.0	0.01	2
EPA 3550/8080 ug/g 0,003 81-A 0-1.5 ND 0,20 100\$ GWB-C 11-11.5 ND 0,25 104\$ EPA 3550/8080 ug/g 0,003 81-A 0-1.5 ND 0,20 80\$ BB-A 2.5-4 ND ND BB-A 2.5-4 ND ND GWB-C 11-11.5 ND 0,20 100\$ BB-A 2.5-4 ND ND CWB-C 11-11.5 ND ND BB-A 2.5-4 ND ND ND ND BB-A 2.5-4 ND ND ND ND BB-A 2.5-4 ND ND ND ND ND ND ND BB-A 2.5-4 ND					B8-A 5-6.5	9	0.20	3 56	B8-A 2.5-4	9	Ş	
CMB-C 11-11.5 ND 0,25 1045 SH SH SH SH SH SH SH S					88-B 0-1.5	2	0,20	100%	GWB-C 11-11.5	2	2	
EPA 3550/8080 ug/g 0,003 81-A 0-1,5 0,009 0,20 80\$ 83-C 5-6,5 ND ND RB-A 2,5-4 ND ND RB-A 5-6,5 ND 0,20 80\$ 88-A 2,5-4 ND ND RB-A 2,5-4 ND ND RB-A 0-1,5 ND 0,20 100\$ 83-C 5-6,5 ND ND RB-A 2,5-4 ND ND ND ND ND RB-A 2,5-4 ND					GW8-C 11-11.5	2	0.25	104\$				
B8-A 5-6.5 ND 0.20 895 B8-A 2.5-4 ND ND ND B8-B C 11-11.5 ND ND B8-B C 11-11.5 ND ND S4B C 11-11.5 ND ND S4B C 11-11.5 ND S4B C 11-11.5 ND S4B C 11-11.5 ND ND S4B C 11-11.5 ND S4B C 11-11.5 ND ND S4B C 11-11.5 S4B C 11-11.5 ND S4B C 11-11.5 S4B C 11-11.5 ND S4B C 11-11.5 S4B C	Sri n	EPA 3550/8080	6/bn	0,003	81-A 0-1.5	600.0	0.20	818	B3-C 5-6.5	9	2	2
B8+B 0-1.5 ND 0.20 75\$ GM8-C 11-11.5 ND 0.25 100\$ GM8-C 11-11.5 ND 0.25 100\$ B8-A 5-6.5 ND 0.20 105\$ B8-A 2.5-4 ND ND B8-A 2.5-4 ND ND GW8-C 11-11.5 ND ND ND GW8-C 11-11.5 ND ND ND ND GW8-C 11-11.5 ND ND ND ND GW8-C 11-11.5 ND					B8-A 5-6.5	2	0.20	80%	88-A 2.5-4	9	ð	
CM8-C 11-11.5 ND 0.25 1005 19.25 1005 19.25 1005 19.25 1005 19.25 1005 19.25					88-B 0-1.5	9	0.20	75%	GWB-C 11-11,5	9	9	
EPA 3550/8080 ug/g					GW8-C 11-11.5	2	0.25	100%				
EPA 5-6.5 ND 0.20 105\$ BB-A 2.5-4 ND ND BB-B 0-1.5 ND 0.20 100\$ GWB-C 11-11.5 ND ND GWB-C 11-11.5 ND ND GWB-C 11-11.5 ND 0.25 96\$ BB-A 2.5-4 ND ND BB-A 5-6.5 ND 0.08 105\$ BB-A 2.5-4 ND ND BB-B 0-1.5 ND 0.08 113\$ GWB-C 11-11.5 ND ND GWB-C 11-11.5 ND ND GWB-C 11-11.5 ND 0.10 100\$	Ë	EPA 3550/8080	6/bn	c_005	B1-A 0-1.5	Q	0.20	\$ 06	83-C 5-6.5	9	9	9
EPA 3550/8080 ug/g 0.004 B1-A 0-1.5 ND 0.25 96\$ EPA 3550/8080 ug/g 0.004 B1-A 0-1.5 ND 0.08 88\$ B3-C 5-6.5 ND ND B8-A 5-6.5 ND ND B8-B 0-1.5 ND 0.08 113\$ GWB-C 11-11.5 ND ND GWB-C 11-11.5 ND 0.10 100\$					B8-A 5-6.5	2	0,20	105%	B8-A 2.5-4	9	Q	
GW8-C 11-11.5 ND 0.25 96\$ EPA 3550/8080 ug/g 0.004 B1-A 0-1.5 ND 0.08 88\$ B3-C 5-6.5 ND ND B8-A 5-6.5 ND 0.08 113\$ GW8-C 11-11.5 ND ND GW8-C 11-11.5 ND 0.10 100\$					B8-B 0-1.5	æ	0.20	100%	GWB-C 11-11.5	9	2	
EPA 3550/8080 ug/g 0,004 B1-A 0-1,5 ND 0,08 88\$ B3-C 5-6,5 ND ND B8-A 5-6,5 ND 0,08 100\$ B8-A 2,5-4 ND ND B8-B 0-1,5 ND 0,08 113\$ GWB-C 11-11,5 ND ND GWB-C 11-11,5 ND 0,10 100\$					GW8-C 11-11.5	2	0.25	\$ 96				
B8-A 5-6,5 ND 0,08 100\$ B8-A 2,5-4 ND 88-B 0-1,5 ND 0,08 113\$ GW8-C 11-11,5 ND 0,10 100\$	ach lor	EPA 3550/8080	6/6n	0,004	81-A 0-1.5	9	0.08	888	B3-C 5-6.5	9	2	2
ND 0,08 113% GM8-C 11-11,5 ND ND 0,10 100%					B8-A 5-6,5	2	0,08	100%	B8-A 2.5-4	9	Q	
ON 0.10					88-8 0-1.5	용	0.08	113\$	GW8-C 11-11,5	9	2	
					GW8-C 11-11,5	2	0.10	100%				

"ND" indicates that the parameter was not detected.

DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Soil Samples

Method Blank		2						QN						;	Q						QN						
Second		2	⊋	2	Q	2	Q	9	9	오	2	QN	9	1	2	2	Q	2	Q	2	118	58%	135	217	13%	12%	328
First Value		9	2	2	9	9	2	9	2	9	9	2	2	!	2	2	9	2	2	2	13%	378	12%	36\$	75	1.8	21\$
Spli† Sample		GW1-B 5-6.5	83-C 5-6.5	B8-A 2.5-4	GW8-A 5-6.5	GW8-B 10-11.5	GWB-C 11-11.5	GW1-B 5-6.5	83-C 5-6.5	B8-A 2.5-4	GW8-A 5-6.5	GW8-B 10-11.5	GW8-C 11-11.5	1	GW1-B 5-6.5	B3-C 5-6.5	B8-A 2.5-4	GWB-A 5-6.5	GWB-B 10-11.5	GW8-C 11-11,5	B3-C 5-6.5	GW3-0 5-6.5	BB-A 2.5-4	84-B 5-6.5	84-E 2.5-4	B4-E 5-6.5	GW4-C 10-12
Percent Recovered		\$19	73%	80%	9 6.9	288		54\$	76\$	808	78\$	808		1	64%	80\$	3 56	16	767								
Spike Conc.		1.0	0	0.1	1.0	0.1		1.0	0.1	0.	0.1	0.1			o <u>.</u>	0.	0.	0.	0.1								
Value		9	9	9	2	2		9	9	£	9	2		,	9	9	9	2	9								
Spiked Sample		GW1-A 10-11.5	GW3-D 5-6.5	88-A 5-6.5	B8-B 0-1,5	GW8-C 11-11,5		GW1-A 10-11,5	GW3-D 5-6.5	B8-A 5-6.5	B8-B 0-1,5	GWB-C 11-11,5			GW1-A 10-11.5	GW3-D 5-6.5	B8-A 5-6,5	B8-B 0-1.5	GW8-C 11-11,5								
Detection	MDL	0.10						0.02							0.02						_•						
ارا ا	6/bn	g/gu						6/6n							6/6n						×						
Method	EPA 3550/8150	EPA 3550/8150						EPA 3550/8150							EPA 3550/8150						EPA 160,3						
Parameter	Herbicides	2,4-0						2,4,5-T							Silver						Moisture						

DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Soil Samples

Oil and Grease Par ame ter

Method	Units	Detection Limit	Splked Sample	In itial Value	Spike Conc.	Percent Recovered	Spilt Sample	First Value	Second	Method
EPA 413.2	6/bn	5.	GW1-A 10-11.5	9	120	8	GW1-A 10-11.5	2	2	9
			B3-C 2.5-4	2	120	1.0%	83-C 5-6.5	9	Q	
			55-30	33.	110	3 26	SS-3C	33.	27.	
			B4-A 2.5-4	450	610	27.01	B4-A 2.5-4	450	470	
			B4-C 5-6.5	40	120	88%	84-8 5-6,5	580	770	
			B4-E 2.5-4	9	120	878	B4-C 5-6.5	40.	40.	
			GW4-A 10-11.5	580	1200	114%	B4-D 5-6.5	430	9	
			SS-4C	2400	2000	103	84-E 2.5-4	9	웆	
			SS-5E	86.	110	122\$	GW4-A 10-11.5	280	1100	
			B7-A 0-1.5	24.	110	1238	GW4-C 10-12	72.	93.	
			B7-B 0-1.5	9	011	108%	SS-4C	2400	2800	
			BB-A 2.5-4	9	120		SS-5E	86.	•99	
			GW8-8 10-11.5	9	120		B7-A 2.5-4	2	2	
							87-8 2,5-4	9	Q	
							GW7-A 10-11.5	63.	64.	
							B8-A 2.5-4	2	9	
							GW8-B 10-11.5	9	2	
EPA 420.2	6/6n	s,	B1-A 2.5-4	9	• 09	\$ 76	GW3-8 5-6.5	9	9	QN
			SS-1A	2	•09	106	GW3-D 5-6.5	9	9	
			GW1-E 20-21.5	2	•09	105%	87-A 0-1.5	2	Q	
			B2-B 0-1,5	9	•09	94%	SS-7A*	2	₹	
			B2-C 0-1.5	14.	•09	102%	GW7-C 15-16.5	2	QN	
			SS-2A	9	•09	106%	B8-8 2.5-4	9	9	
			H3-H 5-6.5	2	•09	102%	B8-B 2-6.5	2	Q	
			B3-C 5-6.5	9	•09	\$ 86	SS-8A*	웆	9	
			GW3-D 5-6.5	2	•09	10 7%	GWB-C 11-11.5	2	Q	
			GW5-A 5-6.5	9	•09	1084				
			B7-A 0-1.5	•9	•09	\$ 16				
			SS-7A*	2	•09	% 66				
			GW7-B 10-11.5	9	•09	105%				
			GW7-C 15-16.5	2	•09	% 66				
			B8-A 5-6.5	2	•09	107				
			B8-B 0-1,5	9	•09	105%				
			SS-8A*	2	•09	\$ 66				

Phenolics

DATACHEN QUALITY CONTROL REPORT Duluth IAP - Soll Samples

Arsenic

Blank NO NO	2
Second Value	57. 24. 40. 66. 100 26. 24. 74. 46.
Value 8.	71. 24. 35. 64. 99. 26. 23. 46. 53.
Sample Sample GWI-E 20-21.5	GW1-A 10-11.5 GW1-E 20-21.5 SS-18 GW3-D 5-6.5 SS-3A GW5-B 9.5-11 SS-7A* GW7-B 10-11.5 BB-A 2.5-4 SS-BA*
Percent Recovered 116\$ 82\$ 120\$ 97\$ 82\$ 82\$ 76\$ 86\$ 68\$	968 849 879 879 879 879 879 879 879 879 879 87
Spika Conc.	100 52. 100 52. 100 52. 52. 52.
In itial Value 11. 8. 18. NO N	57. 24. 40. 50. 100 41. 24. 73. 24.
Spiked Sample B1-A 0-1,5 GW1-E 20-21,5 SS-1B B3-A 0-1,5 SS-3C GW5-B 9,5-11 SS-7A* GW7-A 10-11,5 B7-B 2,5-4 SS-8B* GW3-D 5-6,5 GW3-B 5-6,5	GW1-A 10-11.5 GW1-E 20-21.5 SS-1B GW3-B 5-6.5 SS-3A SS-5B SS-7A* GB-A 5-6.5 SS-8B* GW8-C 11-11.5
Detection Limit	20•
ug/g	6,60
Method EPA 3050/7060	EPA 200,7
Par ame ter	

Barlum

H-122

57.

GW8-C 11-11.5 57.

HADIN Indicator that the natural

DATACHER QUALITY CONTROL REPORT
Dututh IAP - Soil Samples

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1		Uerecrion	Same	01167	2 000	Doctored of	Sp(17	, q	Second	DOI: 100
	S I	 	Sample	Val ue	oug Oug	Kecover ed	Sample	N	90 100	BIGINK
	b/bn	2.	GW1-A 10-11.5	9	2 0°	\$ 86	GW1-A 10-11.5	9	2	2
			GW1-E 20-21.5	9	25.	80%	GW1-E 20-21.5	9	2	
			SS-1B	2	50.	84%	SS-1B	ð	9	
			GW3-B 5-6.5	ð	25.	828	GW3-D 5-6.5	2	Q	
			SS-3A	78.	50.	1148	SS-3A	75.	78.	
			SS-58	9	50.	878	GW5-B 9.5-11	2	₹	
			SS-7A*	6	25.	\$ 06	SS-7A*	•9	7.	
			B8-A 5-6.5	ş	25.	% 06	GW7-B 10-11.5	2	QN	
			SS-8B	43.	25.	938	B8-A 2.5-4	9	₽	
			GW8-C 11-11.5	2	25.	80%	SS-8A*	2	S	
							GW8-C 11-11.5	2	Ð	
	6/6n	<u>-</u> •	GW1-A 10-11.5	2	100	868	GW1-A 10-11.5	2	9	QN
			GW1-E 20-21.5	2	50.	94 %	GW1-E 20-21.5	9	9	
			SS-1B	2	100	\$26	SS-1B	9	QN	
			GW3-B 5-6.5	₽	50.	\$ 06	GW3-D 5-6.5	9	2	
			SS-3A	9	100	94%	SS-3A	2	Q	
			SS-58	2	50.	\$ 66	GW5-B 9.5-11	윷	9	
			SS-7A*	Ð	50.	816	SS-7A*	2	Q	
			BB-A 5-6.5	9	50.	86 %	GW7-B 10-11.5	2	2	
			SS-8B*	2	20°	\$26	B8-A 2.5-4	2	Q	
			GW8-C 11-11.5	2	50°	948	SS-8A*	문	9	
							GWB-C 11-11.5	2	QN	
	6/6n	_•	GW1-A 10-11.5	9	5.	878	GW1-A 10-11.5		2	ON
			GW1-E 20-21.5	9	2.5	828	GW1-E 20-21.5		윤	
			SS-1B	9	5.	% 66	SS-1B		2	
			GW3-B 5-6.5	2	2.5	88%	GW3-D 5-6.5	2	2	
			SS-3A	•9	5.	% 66	SS-3A	&	•9	
			SS-58	2	7.5	88%	GW5-B 9.5-11	ᄝ	2	
			SS-7A*	9	2.5	94%	SS-7A*	2	Ş	
			BB-A 5-6.5	2	2.5	103%	GW7-B 10-11.5	2	2	
			SS-8B*	2	2.5	878	B8-A 2.5-4	9	오	
			GW8-C 11-11.5	9	2,5	107%	SS-8A*	9	2	
							A 11-11 5	5	Š	

^{*} Revised 07/10/87

DATACHEM QUALITY CONTROL REPORT Duluth IAP - Soll Samples

Chromium

Me thod	Blank	9											QN											
Second	Value	19.	15.	=	19.	25.	20.	9	25.	33.	18.	25.												
First	Value	23.	16.	=	20.	24.	21.	9	26.	28.	18.	25.												
+I lqS	Sample	GW1-A 10-11.5	GW1-E 20-21.5	SS-1B	GW3-D 5-6.5	SS-3A	GW5-B 9.5-11	SS-7A*	GW7-B 10-11,5	B8-A 2.5-4	SS-8A*	GW8-C 11-11.5												
Percent	Recovered	84%	94%	101	938	248	103%	\$ 66	\$ 96	878	\$ 86		3 86	\$26	102%	103\$	886	88%	110%	938	110%	838	% 68	\$ 96
Spike	Conc	50.	25.	50.	25.	50.	25.	25.	25.	25.	25.		0.5	0.5	0.5	0.5	0.5	0.5	0.25	0.05	0.5	0.25	0.25	0.5
In itial	val ue	.61	16.	12.	17.	5 9	21.	9	34.	=	25.		9	2	2	9	9	2	2	2	0.2	9	9	Ð
Spiked	Samp le	GW1-A 10-11.5	GW1-E 20-21.5	SS-1B	GW3-8 5-6.5	SS-3A	SS-38	SS-7A*	B8-A 5-6.5	SS88*	GWB-C 11-11.5		GW1-E 20-21.5	SS-1B	B3-A 2.5-4	GW3-B 5-6.5	SS-3C	GW5-B 9.5-11	B7-A 2.5-4	GW7-B 10-11.5	SS-7A*	B8-A 5-6.5	88-B 5-6.5	SS-8B*
Ē													0.1											
	Units	6/bn											6/6n											
	Method	EPA 200.7											EPA 7471											
	Parameter																							

Mercury

* Revised 07/10/87

"ND" indicates that the parameter was not detected.

Revised 07/10/87

DATACHEN QUALITY CONTROL REPORT Duluth IAP ~ Soil Samples

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Method Blank	9	9	2	9	QN	2	Q	9
Second	2	9						
First	9	Ş						
Spilt Sample	GW1-E 20-22,5	B6-B 2,5-4						
Percent Recovered	28 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	84%	82 % 87 %	93\$	1038	% 66	87.6	80% 80% 808 8001
Spike Conc.	က်က်က်က်က်တိတ်တိတ်တိတ်	36.	0.05 0.05	0.7	0.1	0.5	6.5	0.05 0.05 0.05 0.05
In itial Value		Ð	2 2	0.1	9	9	9	5555
Spiked Sample	B1-A 0-1,5 GW1-E 20-21,5 SS-1B B3-A 0-1,5 SS-3C GW5-B 9,5-11 SS-7A* GW7-A 10-11,5 B7-B 2,5-4 SS-8B* GW3-B 5-6,5 GW3-B 5-6,5	86-8 0-1.5	Site 2 DRUM Site 4 0-2.5	Site 4 0-2.5	Site 2 Drum	Site 2 Drum	Sita 2 Orum	Site 2 Drum Site 3 Drum Site 4 0-2.5 GWB-C DRUM
Defection	<u>.</u>	5.	0.01	1.0	0.01	90.0	90.0	0,001
Units	6/6n	6/6n	mg/ Ł	mg/L	mg/L	mq/L	mg/L	mg/L
Method	EPA 3050/7740	P&CAM 338	EPA 1310 BPA 7060	EPA 7080	EPA 7130	EPA 7190	EPA 7421	EPA 7470
Parameter	Set en lum	Ethylene Glycol	EP Toxicity Arsenic	Barium	Cadmium	Chr on lum	pe 9 1	Mercury

DATACHER QUALITY CONTROL REPORT
Duluth IAP - Soil Samples

Me thod Blank	2	9
Second		
First		
Spilt Sample		
Percent Recovered	82 % 93 %	\$ 16
Spike Conc.	0.05	0.1
initial Value	99	9
Splked	Site 2 Drum Site 8 0-2,5	Site 8 0-2.5
Detection	0.01	0.01
thits.	1/6m	mg/L
Method	EPA 7740	EPA 7760
	E Toxicity (continued)	S11 ver

DATACHEN QUALITY CONTROL REPORT Duluth IAP - Water Samples

First Second Method Value , alue Blank	NO ND ND S.4 2.2 2.4 NO ND		ND ND ND 310 320 95		ND ND ND 2000 1300 ND 1400 1300 ND
Spilt	SW-2A MW-2 GW3-B GW3-D GW4-A MW-8 GW5-C SW-5C	!	MW-2 GW3-B GW3-D	MW~2 GW3-B GW3-D	SW-2A NW-2 GW3-B GW3-D GW4-A MM-8 GW5-C SW-5C
Percent Recovered	103% 2501 253% 21111 2011 2011 2011	818 868 868		109% 69% 103%	968 8111 809 879
Spike Conc.	10. 10. 10. 10. 10.	.01 .00		10. 10.	10. 10. 10.
Value	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	555		5.4 7.4 1.9	99999
Spiked	SW-3A MW-2 GW3-B GW3-D GW4-A MW-8 GW5-C SW-5C	MW-2 GW3-B GW3-D		MW-2 GW3-B GW3-D	SW-2A GW4-A MW-8 GW5-C SW-5C
Detection Limit MDL	0.4.5	0.45	0,49	0.44	0,53
Units ug/L	ug/L	ng/L	√L ng/L	ng/L	1/6n
Method EPA 601	EPA 601	EPA 601	EPA 601	EPA 601	EPA 601
Parameter Purgeable Halocarbons		Bromoform	1, I-Dichloroethane	1,2-Dichloroethane	1, 1, 1-Tr ichloroethane

"ND" indicates that the parameter was not detected.

DATACHEM QUALITY CONTROL REPORT Duluth IAP - Water Samples

					Initial	Spike	Percent	Split	First	Second	Method
Parameter	Method	Units	Limit	Sample	Value	Conc	Recover ed	Sample	Value	Value Value	Bigin
(post i rout and continued)	EPA 601	ng/L									
		7			Q	٠0²	% 66	SW-2A	9	2	9
1,1-Dichloroethene	EPA 601	ng/ L			2	10.	868	MW-2	2	윷	
				0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	9	10.	76\$	GW3-B	28.	36.	
				3 H2	2	10	89%	GW3-D	46.	48.	
				0 V II S	9	10.	88	GW4-A	2	2	
) ; ;			MM-8	9	9		
							GW5-C	9	2		
							SW-5C	2	QN		
:	109	70.	0.42	MW-2	9	13.	108%				QN
trans-1,2-Dichloroethene		à		GW3-B	35,	10.	64\$				
				GW3-D	. 89	10.	180%				
		7	04.0	VIII-7	9	.01	86	SW-2A	윷	9	9
Trichloroethene	EPA 601	ug/ r		3.48 3.48	4.4	10	104%	GW4-A	9	2	
				GW3-D	4.4	10.	2111	MM-8	2	9	
				SW-2A	2	10.	\$ 26	GW5-C	2	2	
				GW4-A	Q	10.	\$ 96	SK-5C	9	2	
				MW-8	9	10.	109%				
				GW5-C	9	•01	8 68				
				SW~5C	9	10.	3 86				
		7,5	82.0	SW-7A	9	10.	878	SW-2A	2	Q	Q
Tetrach! oroethene	EPA OUI	ı /fin	200	GW4-A	2	10	109%	MW-2	9	2	
				M + B	Q	01	107	GW3-B	200	460	
				G#5-C	9	10.	102%	6W3-D	100	860	
				SW~5C	9	.01	102	GW4-A	9	2	
				:			M#-8	2	9		
							GW5-C	9	2		
							SW-5C	2	9		

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"ND" indicates that the parameter was not detected.

DATACHBN QUALITY CONTROL REPORT Duluth IAP - Water Samples

Method										
	9			2						9
Second	9 Q Q Q	2		2	Q !	2 9	9	Q	2	8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
First	2222	9		2	9 9	9 9	2	2	2	8 8 % 8 8 8 8 8
Spiit	SW-2A GW4-A MW-8 GW5-C	ე <u>с.</u> ₩		SM-2A	MW-2	GW3-D	GW4-A	MF-8	SW-5C	SW-2A MW-2 GW3-B GW3-B GW4-A MW-8 GW5-C SW-5C
Percent Recovered	89% 80% 80%	1078 978 1048								96% 125% 61% 106% 124% 105% 105% 102% S
Spike Conc.										10. 10. 10. 10. 10. 10.
Initial Value	2	2 2 2		S 5	2	9 9	2 2	5	9	556555
Spiked Sample	SW-2A MW-2 GW3-B GW3-D GW4-A	MW-8 GW5-C SW-5C		SW-2A JW-2	343-B	3W3-D	8-1	W5-C	N-5C	SW-2A MW-2 GW3-B GW3-D GW4-A MW-8 GW5-C SW-5C
Detection Limit	0.37		NO.		9	. ·		9	S	0.64 8.00 8.00 8.00 8.00 8.00 8.00 8.00 8.0
Units ug/L	ng/L		1/6n	1/6n						1/6n
Method EPA 601	EPA 601		EPA 602 EPA 602	700						EPA 602
. (continued)										
Purgeable Helocarbons (continued)			Purgeable Arometics Benzene						Totage	

DATACHEM QUALITY CONTROL REPORT Duluth IAP - Water Samples

			Detection	Splked	Initial	Spíke	Percent	Split	First	Second	Method
Parameter	Method	ch its	Limit	Sample	Value	Conc	Recover ed	Sample	Value	Value	Blank
Pestic Ides	EPA 608	ug/L	MOL								
Aldrin	EPA 608	1/Bn	0,007	GWT-C	£	0.2	\$ 06	0#1-C	9	9	9
				GW3-A	2	0.2	858	GW5-A	2	Q	
				GW3-B	9	0.2	105%	SH-7A	2	9	
				GW5-A	2	0.2	356	S#-84	2	Q	
								SM-88	2	9	
Lindane	EPA 608	ug/t	0,005	6W1-C	9	0.2	10 5%	Ç. 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	2	2	QN
				GW3-A	2	0.2	1001	GM5-A	9	윷	
				GW3-B	2	0.2	120%	SN-7A	2	Ş	
				GW5-A	9	0,2	1001	SM-8A	ş	Ð	
								S#-88	9	Ş	
100-, 4.4	EPA 608	ng/L	0,03	6₩1-C	2	5.0	5 86	GW 7-	2	9	Ð
		5		GW3-A	2	0.5	82%	GM5-A	9	9	
				GW3-B	9	0.5	\$ 96	SW-7A	9	2	
				GW5-A	2	0.5	102%	SW-8A	2	2	
								Sit-88	2	Q	
Dieldrin	EPA 608	ng/L	0,005	GW1-C	2	0.5	\$ 96	GW 1-C	9	9	Q
		ı		GW3-A	9	0.5	\$ 96	GW5-A	2	¥	
				GW3-B	2	0.5	\$ 96	SW-7A	9	Q	
				GW5-A	2	0.5	ž	94-8A	¥	£	
								S#-88	9	Q	
Endr in	EPA 608	ug/L	900°0	GW 1-C	9	6.0	1028	6¥1-c	2	2	Q.
		1		GW3-A	Ð	0.5	\$99	GW5-A	2	9	
				GW3-B	2	6.0	94%	SF-7A	2	Q	
				GW5-A	2	0.5	\$28	S#-8A	2	9	
								SF-88	2	Q	

DATACHEM QUALITY CONTROL REPORT Duluth IAP - Water Samples

Paramater	¥	<u>.</u>	Detection	Spiked	Initial	Spike	Percent	Split	First	Second	Me thod
				21	8	•	30000	Sallpia	8	8	Y I
Pesticides (continued)	EPA 608	ng/L	NO.								
Heptachlor	EPA 608	ng/L	0.007	€1-C	9	0.2	100%	3-1-E	£	2	9
				GW3-A	2	0.2	% 06	GW5-A	9	2	
				GW3-B	9	0.2	120%	84-7A	9	2	
				GW5-A	2	0.2	100%	SW-8A	9	ON	
								88- 8 8	9	2	
Herbicides	EPA 615	uq/L	¥OF								
2,4-0	EPA 615	ng/L	90.0	GW1-C	Ð	12.	\$99	3-1-C	9	2	Ð
				GW3-A	2	12.	74%	GW3-A	2	P	
				GW7 AB	9	12.	738	G#7-B	9	2	
				2−8 49	9	12.	% 09	GWB -A	9	Q	
2,4,5-T	EPA 615	ng/L	90*0	G#1-C	9	2,5	64\$	3€1 -C	Q	9	9
				GW3-A	2	2.5	% 06	GW3-A	2	Q	
				GW7-B	9	2.5	72\$	GW7 -B	2	9	
				2−8 ¥9	9	2.5	58%	GW8 -A	9	Q	
SIIvex	EPA 615	ng/L	90*0	GW1-C	Q	2.5	78%	GW1-C	9	9	9
				GW3-A	2	2,5	100%	GW3-A	2	9	
				GW7-49	9	2.5	73\$	GW7-B	9	9	
				O₩8-C	2	2.5	\$ 09	GWB-A	2	QN	
Oil and Grease	EPA 413.2	mg/L	<u>.</u>	SW-18	2	1.3	\$7.6	GW2-A	2	2	딮
				GW2-D	9	1.5	\$ 96	GW3-A	ð	2	
				SW-2A	2	 	% 66	SW-7A	2.	_:	
				SW-3C	2	1.5	% 66	GW8-A	2	2	
				G#3-C	2	1,3	93%	GW8-B	2	Q	
				SW-4B	- •	1.6	122	GW8-C	Ð	Ð	
				GW4-B	9	1,3	¥1.6	SW-8A	2	Q	
				GW4-C	2	1,3	1001				
				SW-5C	2	1,3	105%				
				GW8-B	2	1,3	94 %				

"NO" indicates that the parameter was not detected.

DATACHEN QUALITY CONTROL REPORT Duluth 1AP - Water Samples

			De tection	Splked	Initial	Spike	Percent	Sp! 14	First	Second	Me thod
Parameter	Method	Units	Limit	Sample	Value	Conc	Recovered	Sample	Value	Va 166	Blank
	C 024 430	1/01/	5.	SW-1A	9	•09	109%	MM-4	2	윷	9
Phenolics	2007 4 2007	ı S	•	SW-2A	9	60.	1001	MW-7	2	ş	
				MIT-2	Ş	. 09	102%	GW2-C	2	2	
				MM−5	2	. 09	112%	GW3-B	.61	17.	
				SW-3A	£	•09	1901	G#5-C	웊	9	
				SW-5A	9	60.	1078	GWT -B	2	S	
				G#5-A	2	•09	114%	SW-8B	6	6	
				J-845	2	. 09	107%	6W8-C	2	Q	
				GW3-B	.01	•09	104%				
	0 700	7	6	SW-18	2	60.0	82%	GW1-E	9	9	QN
Arsen ic	EFA 400.4	mg/r	<u>.</u>	SK-38	2	60.0	\$ 86	GW8-B	9	Ş	
				SW-5A	9	0.0	86\$	SW-88	9	Q	
				GW5-B	2	0.05	\$ 09				
				GW5-C	2	0.05	\$0\$				
				SW-8A	S	0.05	\$28				
				SW-88	9	0.05	211				
	900	1/04	0.0	¥1 - #5	S	0,95	366	GW1~E	0.5	0.2	Q
Barium		j j	•	GW1-E	0.5	0.48	856	GWB-B	0.5	Ş	
				SW-3C	æ	96*0	% 66	SW-8B	9	2	
				SW-5C	Ð	0,95	% 66				
				GW7-A	0.5	0.48	\$ 16				
				GWJ -C	2	0.95	104%				
				SW-BA	S	0.48	7611				
				SW-88	9	0.48	1178				
				G-848	0,2	96.0	102%				

ONTACHEN QUALITY CONTROL REPORT
Duluth IAP - Water Samples

Par ame ter	Method	Units	Detection Limit	Splked Sample	in itial Value	Spike Conc.	Percent Recovered	Split Sample	First	Second	Method
Cadmium	EPA 213.1	J/gm	0.01	₹-1×		0.10	107	€ I-E	9	2	9
				SW-3C		0.10	102\$	G#8 #9	2	S	
				SW-5C		0.10	1118	88-88	9 5	€ €	
				SW-7A		0.05	8/16	} ;	2	<u>}</u>	
				£7-€		0.10	×				
				S#-88		0.05	101				
Chranium	EPA 218.1	1/bm	0.05	6 11		0.0	% L0		•		
)		¥ -			416	GW1-E	0.10	0.08	9
				SW-3C		*7*0	4 5 7 1	9 2 3 5	0,30	o <u>.</u> 0	
				S 4 8			5	98- 75	2	2	
				34 CMG		\$:	4 /6				
				V-/M5		0,48	%				
				C#0		0.24	86≸				
				SW-8A		0.24	114\$				
				SW-88		0.24	104%				
peel	EPA 239.2	mg/L	0.02	SW-3A		0.05	120%	<u> </u>	Ş	Ş	9
				BAIL RNSE 7		0.05	85%	0.48 0.48 0.48 0.48	9 9	2	3
				SW-8A		0.05	\$7.6	SW88	0.04	0.03	
				S¥+88	_	0.05	85%			•	
Silver	EPA 272.1	mg/L	0.01	SW-1A		0.10	¥101	GW1-E	9	Ş	Ş
				SW-3C		0.10	¥1.6	GWB -B	2	2	į
				SW-5C		0.10	948	SW-88	2	9	
				GW5-B		0.10	\$ 96				
				GW5-C		0,10	102				
				SW-7A		0.05	\$16				
				GW7-C		0,24	93\$				
				SW8B		0.05	\$ 16				

DATACHEN QUALITY CONTROL REPORT Duluth IAP - Water Samples

Biank ND	9	
Second Value ND	9999	9 9 9 9
Value NO NO	9999	. 8 8 M
Sample GWI-E GWB-B SM-88	GW1-E SW-7A SW-88 GW8-B	18. 12. 5.0
Percent Recovered 72\$ 72\$ 72\$ 103\$ 107\$	958 958 1008 1108 1109 1109 1208 1109 1109	GW10-B GW10-B GW10-B
Sp I ke Conc. 0.09 0.09 0.05 0.05	0.002 0.002 0.002 0.001 0.001 0.001 0.002 0.001 0.002	
Value Value NO NO NO NO NO NO NO NO NO NO NO NO NO	2 2 2 2 2 2 2 2 2 2 2	
Spiked Sample Sw-18 Sw-5A Sw-5A Sw-8A Sw-8A	GW3-A GW3-C GW3-D RNSE BLK 5 GW7-B SW-7A BAIL RNSE 7 GW8-A SW-8A GW8-C GW8-C GW8-C	
Limit 0.01	00.001	0
Haits	mg/L	p Ci/L
Method EPA 270,2	EPA 245, 1	Std. Method 703 Std. Method 703 Std. Method 706 Std. Method 706
Par ameter Selenium	Mercury	Gross Alpha Gross Beta Gross Beta Radium-226 Radium-228

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DATACHEM AMALYTICAL REPORT Duluth IAP - Soll Samples Second Column Confirmations

Parameter	Me thod	Units	Detection	Field #: Site :	81-A 0-1.5 ONE	81-A 2.5-4 ONE	81-A 5-6.5 ONE	GW1-A 10-11.5 ONE	6W1-B 5-6.5 ONE	GW1-E 20-21,5 ONE	SS-1A ONE	SS-1B ONE	82-8 0-1.5 TWO
Purgeable Halocarbons Bromodichloromethane (f) Bromodichloromethane (s)	EPA 8010 (*) ug/g EPA 8010 ug/g EPA 8010 ug/g	6/6n 6/6n	0,0018		NEG NEG	NEG NO	NEG PO	N N N N N N N N N N N N N N N N N N N	NEG NEG	ON NEG	S S S S S S S S S S S S S S S S S S S	S S	ND NEG
Bromoform (f) Bromoform (s)	EPA 8010 EPA 8010	6/6n 6/6n	0,0022		NEG NEG	NEG NE	NEG NEG	ON NEG	N EG	N NEG	N N BB	ND NEG	NEG NEG
Bromomethene (f) Bromomethene (s)	EPA 8010 EPA 8010	6/6n	0,0032 0,0032		NEG NEG	N NEG	NEG PO	ND NEG	NEG NEG	NEG PO	NEG NEG	NEG NEG	NEG NEG
Carbon Tetrachloride (f) Carbon Tetrachloride (s)	EPA 8010 EPA 8010	6/6n 6/6n	0.0023		ND	ND NEG	ND NEG	N NEG	NEG N	ND NEG	S S	ON SB	NEG NEG
Chlorobenzene (f) Chlorobenzene (s)	EPA 8010 EPA 8010	6/6n 6/6n	0,0018		NEG NEG	ND NEG	ND NEG	NEG NEG	ND NEG	NEG NO	S S S	A SE	NEG NEG
Chloroethana (f) Chloroethana (s)	EPA 8010 EPA 8010	6/6n 6/6n	0,0019		G PEG	ND NEG	ND NEG	NEG NO	NEG TO	NEG NG	ND NEG	NEG NO	NEG A
2-Chloroethylvinyl Ether (f) 2-Chloroethylvinyl Ether (s)	EPA 8010 EPA 8010	6/6n 6/6n	0,0022		ND NEG	S Se	NEG NE	NEG A	NEG NE	ON NEG	NO NEG	<u>X</u>	NEG NE
Chloroform (f) Chloroform (s)	EPA 8010 EPA 8010	6/6n 6/6n	0,0022		NEG	NEG K	ND NEG	NEG	N EG	NEG NEG	NEG NO	N RE	NEG NEG
Chloramethane (f) Chloramethane (s)	EPA 8010 EPA 8010	6/6n 6/6n	0,0024		ND	ND NEG	NEG	NEG NEG	NEG	NEG NEG	2 92	N SEC	NEG NE
Dibromochioromethane (f)	EPA 8010 EPA 8010	6/6n 6/6n	0.0016		NEG NEG	NEG NEG	NEG NEG	NEG	S S S	N NEG	N NEG	9 S S	NEG S

^(*) Methods documented in previous Analytical Reports Section.

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soll Samples
Second Column Confirmations

					82-8	B2-B	B2-C	B2-C	B2-C	GW2-A	GW2-B	GW2-C	GW2-D
			Detection	Field #:	2.5-4	5-6.5	0-1.5	2,5-4	5-6.5	5-6.5	5-6.5	15-16.5	15-16,5
Parameter	Me thod	Un i ts	Limit	Site :	TWO	OML	OML	OMI	OML	OML	OML	DMO	OML
Purgeable Halocarbons (cont.)	EPA 8010	6/6n	MQ										
Bromodichioromethene (f)	EPA 8010	5/6 0	0,0018		9	ð	2	욧	Ð	2	2	2	2
Bromodichtoromethane (s)	EPA 8010	6/6n	0.0018		NEG	NEC	NEG						
	PPA 8010	mo/a	0.0022		9	9	9	2	9	2	9	9	9
Bromoform (s)	EPA 8010	6/6n	0,0022		NEG	NEG							
3)	EPA ROLD	0/01	0.0032		2	9	9	9	2	9	2	Q	9
Bromomethane (s)	EPA 8010	6/6n	0,0032		NEG	NEG							
Caches Tate achievide (+)	FPA 8010	0/011	0.0023		9	£	9	9	2	9	2	2	2
Carbon Tetrachloride (s)	EPA 8010	6/6n	0,0023		NEG	NEG							
(+)	FPA 8010	0/011	0.0018		2	2	Ş	2	9	2	9	2	2
Chlorobenzene (s)	EPA 8010	6/6n	0,0018		NEG	N EG							
(*)	FPA 8010	0/00	0.0019		9	2	9	9	9	9	9	2	Ş
Chloroethane (s)	EPA 8010	6/6n	0,0019		NEG	N EG	NEG						
2.00 Language (4)	FPA 8010	0/011	0.0022		£	Q	2	9	9	9	9	2	2
2-Chloroethylvinyl Ether (s)	EPA 8010	6/6n	0,0022		NEG	NEG E							
	FPA 8010	0/00	0.0022		Ş	9	Š	Ð	2	Ş	2	Ð	2
Chloroform (s)	EPA 8010	6/6n	0,0022		NEG	NEG							
(4)	6PA 8010	0/01	0.0024		9	2	2	9	9	9	2	9	9
Chloromethane (s)	EPA 8010	6/6n	0,0024		NEG	88 88	NEG						
Oite de de la company (f.)	FPA 8010	na/a	0.0016		9	9	9	2	Ş	2	2	Ð	9
Dibromochioromethane (s)	EPA 8010	6/6n	0,0016		NEG	NEG							

DATACHEM AMALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

					GW2-E				B3-A	83-A	83-A	83-8	83-8
			Detection	Field #:	15-16.5	SS-2A	SS-2B	SS-2C	0-1.5	2.5-4	5-6.5	0-1-5	2.5-4
Parameter	Me thod	E its	Limit	Site :	JWO	OMI	OML	OM	THREE	THREE	THREE	THREE	THREE
Purgeable Halocarbons (cont.)	EPA 8010	6/6n	MO										
Branodichioranethane (f)	EPA 8010	6/6n	0,0018		9	Q	Q	2	ð	2	2	9	9
Bromodichloromethane (s)	EPA 8010	6/6n	0,0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	6/6n	0.0022		9	Q	⊋	9	9	9	9	2	9
Bromoform (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	b/bn	0,0032		Q	Q	9	9	9	9	9	9	9
Bromomethane (s)	EPA 8010	6/6n	0,0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachioride (f)	EPA 8010	6/6 n	0,0023		Q	ð	Ð	9	2	9	9	2	9
Carbon Tetrachloride (s)	EPA 8010	6/6n	0,0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	b/bn	0.0013		9	9	9	용	2	2	2	2	Ð
Chlorobenzene (s)	EPA 8010	6/6n	0,0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N BC	NEG
Chloroethane (f)	CPA 8010	6/6n	0,0019		9	₹	9	Ş	2	2	2	£	2
Chloroethane (s)	EPA 8010	6/6n	0,0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	6/6n	0,0022		2	Ð	2	Q	Q	9	₽	9	Ş
2-Chloroethylvinyl Ether (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (†)	EPA 8(7.1)	6/6n	0,0022		2	9	QN	S	Q	9	2	9	9
Chloroform (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NE6
Chloromethane (f)	EPA 8010	6/bn	0.0024		9	ð	9	Ð	9	ð	9	2	2
Chloromethane (s)	EPA 8010	6/6n	0,0024		NEG	NEG	NEG	NEG	NEG	N 66	NEG	NEG	NEG
Dibramochioramethane (f)	EPA 8010	6/6n	0,0016		2	9	£	Ð	2	9	2	2	2
Dibromochioromethane (s)	EPA 8010	6/6n	0,0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

DATACHEN ANALYTICAL REPORT Dufuth IAP ~ Soll Samples Second Column Confirmations

643-0 5-6.5 SS-3A THREE THREE	ND ND NEG NEG	ND ND NEG NEG	ND ND NEG NEG	ND ND NEG NEG	NO NO NEG	NO NO NO NEG	ND ND NEG NEG	ND ND NEG NEG	Q 9 9	NEG NEG
043-8 5-6.5 THREE	ND NEG	S S S S S S S S S S S S S S S S S S S	Se Se	O SE	S S	NEG N	ON NEG	NEG NEG	-	992
643-A 5-6.5 THREE	ð å	ND NEG	N NO	ND NEG	S S	ND	NEG	S S	-	S KEG
83-C 5-6.5 THREE	SES.	NEG NEG	N ON NEG	NEG NO	G S	ND NEG	NEG	NEG NEG	-	N NEG
83-C 5-6.5 THREE	NO NEG	Z S	<u> 2</u>	ð ä	ON S	NEG NEG	N NEG	ND NEG	ND NEG	ON CO
83-C 2.5-4 THREE	9 9	ô g	Ð Å	2 2	2			QN S	NO NO SEG	ON OS
83-C 0-1.5 THREE	9 9	9	2	9 9						NO NO NO NEG
B3-B 1 #: 5-6.5 : THREE	Q.	Q Q	NEG NO		Sec 9	ON ON COMPANY		ON SER	- z	- 2
Detection Field	MCL. 0,0018	0,0018	0,0022	0,0032	0,0023	0.0018	0,0019	0.0022	0.0022 0.0024 0.0024	0,0016
D Stinu	6/6n	6/6n	6/6n	6/6n	6/6n	6/6n	6/6n 6/6n		6/6n (6/6n (
bott etc.		EPA 8010	EPA 8010	EPA 8010	EPA 8010	EPA 8010 EPA 8010	EPA 8010	EPA 8010 EPA 8010	EPA 8010 EPA 8010	EPA 8010 EPA 8010
•	Purgeable Halocarbons (cont.)	gramodichloramethane (1) Bramodichloramethane (s)	Bromoform (f) Bromoform (s)	Gronomethane (f) Gronomethane (s)	Carbon Tetrachloride (†) Carbon Tetrachloride (s)	Chlorobenzene (f) Chlorobenzene (s)	Chloroethane (s) Chloroethane (s)	2-Chloroethylvinyl Ether (s)	Chloroform (s) Chloroform (s) Chloroform (f)	Chloromethane (5) Dibromochloromethane (†)

11-138

"ND" indicates that the parameter was not detected.

100 100

DATACHER ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

					,	;	84-C	94-c	94-c	B4-D	B4-0	84-D	B4-E
Parameter	Me thod	Un its	Detection	Field #: Site :	SS-38 THREE	SS-3C THREE	FOUR	FOUR	FOUR Y	FOUR	FOUR	FOUR	FOUR
Purgeable Halocarbons (cont.)	EPA 8010	6/6n	Ą										
Branodichloramethane (f)	EPA 8010	6/6n	0.0018		Ş	9	9	9	9	2	9	2	9
Bromodichloromethene (s)	EPA 8010	6/6n	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	b/bn	0,0022		9	9	9	9	2	2	2	S	9
Bromoform (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	b/bn	0,0032		S	Ą	9	Ð	9	2	9	9	9
Bramanthane (s)	EPA 8010	6/6n	0,0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachioride (f)	EPA 8010	ua/a	0,0023		Ş	9	9	Ş	9	9	9	9	9
Carbon Tetrachloride (s)	EPA 8010	6/6n	0,0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chiorobenzene (f)	EPA 8010	0/00	0,0018		9	9	9	₽	2	2	2	9	Q
Chlorobenzene (s)	EPA 8010	6/6n	0,0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	FPA 8010	0/00	0.0019		9	윤	9	9	9	9	9	9	9
Chloroethane (s)	EPA 8010	6/6n	0,0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	p/pu	0,0022		₹	S	ᄝ	9	2	2	9	9	2
2-Chioroethylvinyl Ether (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	98 N	NEG
Chloroform (f)	EPA 8010	6/6n	0,0022		g	0,0053	9	9	9	2	9	9	ð
Chloroform (s)	EPA 8010	6/6n	0,0022		NEG	POS	NEG	NEG	NEG	NEG	N EG	NEG	NEG
Chloromethane (f)	EPA 8010	b/bn	0,0024		2	9	2	9	2	9	9	9	ð
Chloromethane (s)	EPA 8010	6/6n	0,0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG NEG	NEG	NEG
Dibromochioromethane (+)	EPA 8010	p/pu	0,0016		9	9	Q	9	9	2	2	2	ð
Dibramochioramethane (s)	EPA 8010	6/6n	0,0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	98 88	NEG

"NO" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Dututh IAP - Soil Samples
Second Column Confirmations

			Datection	Fleid #:	B4-E 5-6.5	GW4-A	GW4-B 5-6.5	GW4-C	GW4-D	84-A	B4-A 7-6.5	B4-A	84-B
Parameter	Me thod	un its	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOGR	FOUR	FOUR
Purgeable Halocarbons (cont.)	EPA 8010	6/60	MO										
Branodichioramethane (f)	EPA 8010	6/6n	0,0018		9	Q	2	2	9	2	2	9	9
Bramodichioramethane (s)	EPA 8010	6/6n	0,0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Brasofors (f)	EPA 8010	b/bn	0,0022		Q	9	2	9	9	9	2	9	9
Bromoform (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	na/a	0,0032		£	S	Ş	Ş	9	2	2	9	9
Bromomethane (s)	EPA 8010	6/6n	0,0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (†)	FPA 8010	ua/a	0.0023		9	9	æ	9	9	2	2	2	9
Carbon Tetrachioride (s)	EPA 8010	6/6n	0,0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
(+) anatamatana (+)	FPA 8010	0/01	0.0018		Ş	Ş	Ş	Ş	5	2	2	9	9
Chlorobenzene (s)	EPA 8010	6/6n	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
(*) oce # 6000 (*)	EDA BOLD	9/01	9100		Ş	Ş	Ş	Ş	9	Ş	Ş	Ş	Ş
Chloronthane (s)	EPA 8010	6/6n	0,0019		N S	NEG E	NEG E	NEG	NEG E	N EG	NEG E	SE SE	NEG
))											
2-Chloroethylvinyl Ether (f)	EPA 8010	6/6n	0.0022		윷	9	9	ᄝ	9	9	Ð	g	9
2-Chloroethylvinyl Ether (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	S RC	NEG	NEG	NEG	N BC	NEG
Chloroform (f)	EPA 8010	6/6n	0.0022		£	2	S	9	2	9	9	2	9
Chloroform (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	99 N	NEG	NEG	NEG
(b) compathene (b)	2010	2/2	0 0024		Ş	Ş	S	9	9	Ş	Ş	Ş	Ş
Chloromethane (s)	EFA 8010	s/s	0.0024		NEG	9 9	99	SEG E	NEG E	NEG	NEG	NEG	NEG
		n .			!			!		į	Ş	<u>:</u>	ş
Dibramochioramethane (f)	EPA 8010	6/6n	0.0016		9	2	⊋	2	2	2	2	₹	2
Dibromochioromethane (s)	EPA 8010	6/6n	0.0016		N EG	NEG	9 9 8	N EG	Sec	NEG	NEG NEG	NEG	NEG

Duluth IAP - Soil Samples Second Column Confirmations

					B4-B	B4-B					G-15-A	GW5-B
			Detection	Field #:	5-6.5	7.5-11.5	SS-4A	SS-4B	SS-4C	SS-4D	5-6.5	9.5-11
Parameter	Me thod	un i ts	Limit	Si te :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FIVE	FIVE
Purgeable Halocarbons (cont.)	EPA 8010	6/6n	MDL									
Bromodichioromethane (f)	EPA 8010	6/6n	0,0018		2	9	2	2	2	2	9	9
Bromodichloromethane (s)	EPA 8010	6/6n	0,0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bramoform (f)	EPA 8010	6/6n	0,0022		⊋	2	2	9	ð	9	2	2
Bromoform (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bramamethane (f)	EPA 8010	6/6n	0,0032		2	Q	9	2	2	9	2	9
Bromomethane (s)	EPA 8010	6/6n	0,0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (+)	EPA 8010	6/6n	0,0023		9	9	9	9	Ş	9	2	9
Carbon Tetrachioride (s)	EPA 8010	6/6n	0,0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	6/6n	0,0019		9	9	2	9	9	9	9	9
Chlorobenzene (s)	EPA 8010	6/6n	0,0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	6/6n	0.0019		2	2	9	9	9	9	9	9
Chloroethane (s)	EPA 9010	6/6n	0,0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	6/6n	0.0022		9	9	9	9	9	₽	9	9
2-Chloroethylvinyl Ether (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	6/6n	0,0022		Q	S	9	9	9	2	2	9
Chloroform (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloramethane (f)	EPA 8010	6/6n	0.0024		ᄝ	Q	Q	9	9	2	9	2
Chloromethane (s)	EPA 8010	6/6n	0,0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochioromethane (f)	EPA 8010	6/6n	0,0016		£	9	Q	9	9	9	9	9
Dibromochioromethane (s)	EPA 8010	6/6n	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEN ANALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

Parameter	Me thod	Units	Detection Limit	Fleid #: Site :	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-58 FIVE	SS-5C FIVE	SS-50 FIVE	SS-5E FIVE	86-A 0-1.5 SIX	86-A 2.5 4 SIX	86-8 0-1.5 SIX
Bronodichloromethane (f)	EPA 8010 EPA 8010 EPA 8010	6/6n 6/6n 6/6n	MD. 0.0013 0.0018		A NEG	ND	N S	G S	G S	ON DEG	N EG	N EG	N NEG
Brosoform (†)	EPA 8010	6/6n	0.0022		NEG NEG	ND NEG	ND	NEG NEG	NEG NO	NEG NEG	S S S	N PEG	NEG NEG
Broscosethane (†)	EPA 8010 EPA 8010	6/6n 6/6n	0,0032		NEG NEG	N EG	N N EG	NEG NE	NEG NO	N EG	NEG NEG	NEG 15	ND NEG
Carbon Tetrachloride (f)	EPA 8010 EPA 8010	6/6n	0,0023		ND NEG	NEG NEG	NEG NEG	NEG NEG	O SE	NEG NEG	N KD	NEG NEG	NEG NEG
Chlorobenzene (†)	EPA 8010 EPA 8010	5/6n 6/6n	0.0018		NEG A	ND NEG	N NEG	NEG NO	NEG N	ND NEG	NEG AD	N BG	NEG NEG
Chloroethane (f)	EPA 8010	6/6n 6/6n	0.0019		ND NEG	ON ON SEC	N NEG	N N N EG	ND NEG	NEG NO	S S	S S S	ND
2-Chioroethyivinyi Ether (f)	EPA 8010	6/6n	0.0022		ND	NEG NEG	NEG Å	N NE	N EG	NEG AD	S S S	NEG NEG	NEG NEG
Chloroform (f) Chloroform (s)	EPA 8010 EPA 8010	6/6n	0,0022		ND	N KEG	N NEG	NEG NEG	S &	NEG NEG	N.E.G.	NEG NEG	NEG NEG
Chioromethane (f) Chioromethane (s)	EPA 8010 EPA 8010	6/6n	0,0024		NEG N	NEG	N S S	NEG NEG	NEG	N N N N N N N N N N N N N N N N N N N	NEG NEG	O S	9 9 9
Dibromochloromethane (f) Dibromochloromethane (s)	EPA 8010 EPA 8010	6/6n	0,0016		NEG NEG	NEG NEG	ND NEG	N N N EG	NEG NEG	NEG NE	S S S	9 9	Ne.

"ND" indicates that the parameter was not detected.

DATACHER ANALYTICAL REPORT
Duluth IAP - Soll Samples
Second Column Confirmations

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					8-98	87-A	B7-A	B7B	87 <i>-</i> 8	GW7 A	GW7-B	G#7-C	
			Detection	Field #:	2.5-4	0-1.5	2.5-4	0-1-5	2.5-4	10-11.5	10-11.5	15-16.5	SS-7A*
Parameter	Me thod	Units	Limit		SIX	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN
Purgeable Helocarbons (cont.)	EPA 8010	6/6n	MDL										
Broandich (comethens (f)	EPA 8010	na/a	0.0018		9	2	2	₽	2	2	9	2	9
Bromodichior cmethane (s)	EPA 8010	6/6n	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4	FDA A010	0/01	0.0022		9	2	2	Q	9	₽	2	Ð	2
Bromoform (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
	9	, ,	0 00 0		Ş	Ş	Ş	9	9	2	2	2	9
Bromomethane (1)	EPA 8010	6/6n	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
	0108 403	0,01	0.0023		S	2	9	2	2	2	2	2	9
Carbon Tetrachioride (5)	EPA 8010	5/5n	0,0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
			9100		Ş	Ş	5	9	9	2	2	9	9
Chlorobenzene (†)	EPA 8010	5/6n	0.0018		NEG N	N Si	NEG E	NEG	NEG	9 9 8	N EG	NEG	NEG
Chloropenzene (5)	מים מים	ñ/ĥn	2		2	!							
Chloroethane (+)	EPA 8010	p/6n	0.0019		2	9	2	9	9	2	2	₹	2
Chloroethane (s)	EPA 8010	6/6n	0,0019		NEG	NEG	NEG	NEG	NEG	NEG	98 80	NEG	NEG
100000000000000000000000000000000000000	6PA 8010	0/01	0.0022		9	2	9	2	2	9	9	2	9
2-Chloroethylvinyl Ether (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
	FPA 8010	0/011	0.0022		9	2	9	2	2	2	2	2	9
Chloroform (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
	CDA A010	9,01	0.0024		9	2	Q	9	9	9	Ş	2	9
Chloromethane (s)	EPA 8010	6/6n	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	9 9 8	NEG	NEG
(4)	FPA 8010	0/01	0.0016		2	2	9	9	2	2	g	2	2
Dibramochioramethane (s)	EPA 8010	6/6n	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

^{*} Rev I sed 07/10/87

DATACHEA ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

					R.A.A	P8 -	88 - ¥	ዋ 88	9	1	GWB-A	G#8-B	G#8-C
			Detection	Field #:	0-1.5	2.5-4	5-6.5	6-1-0	2.5-4	5-6.5	5-6.5	10-11.5	6-11-01
Parameter	Me thod	un its	Limit		EIGHT	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT	E	EIGHT
Purgashie Halocarbons (cont.)	EPA 8010	6/60	MD								,	Ç	ģ
	0109	0/01	0.0018		2	2	9	2	2	Z	9	9	2 !
Bromodichloromethane (s)	EPA 8010	6/6n	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	9	3	S S S S
		,			Ş	Ş	Ç	Ş	ş	2	9	2	9
Brosports (f)	EPA 8010 EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
					Ş	9	Ş	Ş	2	9	2	9	2
Broscathane (f)	EPA 8010 EPA 8010	5/6n	0,0032		NEG E	NEG 5	NEG 1	NEG NEG	NEG	N CES	NEG	NES.	NEG
			:		ģ	Ş	Ş	Ş	Ş	9	2	2	2
Carbon Tetrachioride (f)	EPA 8010	6/6n	0,0023		2 5	2 5	S S	, SE	99	NEG	NEG	SB	NEG
Carbon Tetrachloride (s)	EPA 8010	6/60	0,0025		3	2	}	}					
	3	9) 6::	8100.0		2	2	2	9	9	9	2	2	9 !
Chlorobenzene (†)	EPA 8010 EPA 8010	5/5n	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	SEN	NEG	NEG NEG
					•	į	ç	ş	Ş	Ş	2	9	9
(4)	EPA 8010	6/6n	0,0019		9	2	2	€ '	2 1	1		NEC	SHS.
Chloroethane (s)	EPA 8010	6/6n	0,0019		NEG	NEG	NEO	NEG N	NEG N	NEG NEG	2	3	ì
	•		6		ş	9	9	9	2	2	9	2	ş
2-Chloroethylvinyl Ether (f) 2-Chloroethylvinyl Ether (s)	EPA 8010 EPA 8010	6/6n	0.0022		S S S S S S S S S S S S S S S S S S S	NEG	NEG	NEG	NEG	9 9 9	NEG	SB	NEG
		•	6		Ş	Ş	S	9	9	2	9	9	9
Chloroform (f)	EPA 8010 EPA 8010	5/6n 5/6n	0,0022		NEG	NEG	N SS	NEG	NEG	S N	NEG	98 80 80 80 80 80 80 80 80 80 80 80 80 80	NEG
			4000		Ş	2	9	9	£	9	2	9	₹
Chloraethane (4)	EPA 8010	6/6n	0,0024		9	NEG	NEG	NEG	NEG S	NEG	98 88 88	89 89 89	NEC
			•		ç	9	9	9	2	9	9	2	9
Dibramochloramethane (f) Dibramochloramethane (s)	EPA 8010 EPA 8010	6/6n 6/6n	0,0016		NEG EG	S S	9	NEG	NEG	NEG	NEG	S S S	NEG

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"ND" indicates that the parameter was not detected.

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"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
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Parameter Method Units Limit Hallocarbons (cont.) EPA 8010 ug/g MUL loramethane (f) EPA 8010 ug/g 0.0018 ioramethane (s) EPA 8010 ug/g 0.0018 (f) EPA 8010 ug/g 0.0022		- imit	Site :	E1 GHT	EIGHT	
EPA 8010 ug/g EPA 8010 ug/g EPA 8010 ug/g	6/6n	i CM				
lorcmethane (f) EPA 8010 ug/g lorcmethane (s) EPA 8010 ug/g (f) EPA 8010 ug/g		,				
loramethane (s) EPA 8010 ug/g		.0018		Ş	QN	
(+) EPA 8010 ug/g		.0018		NEG	NEG	
		,0022		2	Ð	
	0 6/6n	0.0022		NEG	NEG	
Bromomethane (†) EPA 8010 ug/g 0,0032		.0032		2	9	
Bromomethane (s) EPA 8010 ug/g 0.0032		.0032		NEG	NEG	
Carbon Tetrachioride (†) EPA 8010 ug/g 0.0023		.0023		9	Q	
Carbon Tetrachloride (s) EPA 8010 ug/g 0,0023		.0023		NEG	NEG	
Chlorobenzene (f) EPA 8010 ug/g 0,0018		.0018		2	Q	
Chlorobenzene (s) EPA 8010 ug/g 0,0018		•0018		NEG	NEG	
Chloroethane (f) EPA 8010 ug/g 0,0019		6100*		2	9	
Chloroethane (s) EPA 8010 ug/g 0,0019		•0019		NEG	N EG	
2-Chloroethylvinyl Ether (f) EPA 8010 ug/g 0,0022		•0022		Ş	Q.	
2-Chioroethyivinyi Ether (s) EPA 8010 ug/g 0.0022		.0022		NEG	NEG	
Chloroform (f) EPA 8010 ug/g 0.0022		.0022		2	Q	
Chloroform (s) EPA 8010 ug/g 0,0022		.0022		NEG	NEG	
Chloromethane (†) EPA 8010 ug/g 0,0024		,0024		9	QN	
Chloromethane (s) EPA 8010 ug/g 0.0024	_	•0024		NEG	NEG	
Dibromochloromethane (†) EPA 8010 ug/g 0,0016		.0016		ð	Ş	
Dibromochi or omethane (s) EPA 8010 ug/g 0,0016		• 0016		NEG	NEG	

^{*} Revised 07/10/87

Duluth IAP - Soil Samples Second Column Confirmations

			Detection	Field #:	B1-A 0-1-5	B1-A	B1-A 5-6.5	GW1-A 10-11.5	GW1-8 5-6-5	GW1-E 20-21.5		SS~18	82-B 0-1.5
Parameter	Me thod	un its	Limit	Site :	ONE	ONE	ONE	ONE		ONE	ONE	ONE	OM.
Purgeable Halocarbons	EPA 8010	6/6n	TO N										
1,2-Dichlorobenzene (f)	EPA 8010	6/6n	0.0014		9	9	9	9	2	9	₽	9	9
1,2-Dichlorobenzene (s)	EPA 8010	6/6n	0,0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	6/6n	0,0021		9	9	Q	9	₽	9	9	2	2
1,3-Dichiorobenzene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1.4-Dichlorobenzene (f)	EPA 8010	ua/a	0,0020		9	9	2	9	2	9	2	2	9
1,4-Dichlorobenzene (s)	EPA 8010	6/6n	0,0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	p/pu	0.0016		9	2	9	9	9	9	9	2	9
Dichlorodifiuoromethane (s)	EPA 8010	6/ 6 n	0,0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1.1-Dichioroethane (f)	EPA 8010	b/bn	0.0025		ð	Ð	QN	9	9	9	윤	9	9
1,1-Dichloroethane (s)	EPA 8010	6/6n	0,0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1.2-Dichloroethane (f)	EPA 8010	ua/a	0,0022		9	9	2	2	2	9	9	9	9
1,2-Dichloroethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	6/6n	0.0025		9	2	Q	2	9	9	9	2	9
1,1-Dichloroethene (s)	EPA 8010	6/60	0,0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	6/bn	0,0021		Ş	9	₽	9	2	2	2	9	9
trans-1,2-Dichloroethene (s)	EPA 8010	6/60	0,0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	6/bn	0,0010		9	ð	9	9	9	2	9	9	9
1,2-Dichloroprowne (s)	EPA 8010	6/6n	0,0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichlor, opene (f)	EPA 8010	p/pu	0,0048		9	9	9	9	2	2	9	9	2
cis-1,3-Dichloropropene (s)	E?A 8010	6/6n	0,0048		NEG	NEG	NEG	NEG	NEG	NEG	8 8 8	NEG	NEG

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					82-8	82-8	82-C	B2-C	85-C	GW2-A	GW2-8	GW2-C	GW2-0
			Detection	Field #:	2.54	5-6.5	0-1.5	2.5-4	۲ ر•	۲. د.	70.7	C*01-CI	13-10-3
Parameter	Me thod	Units	Limit	Site :	TWO	J.M.O	OML	OM	E	TWO	0		Q.
Purgaable Halocarbons (cont.)	EPA 8010	6/6n	JQ.										
1.2-Dichlorobenzene (†)	EPA 8010	0/60	0,0014		2	9	윤	9	2	Ð	9	9	2
1,2-Dichlorobenzene (s)	EPA 8010		0,0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG EG	NEG
	FP4 8010	0/01	0 00 1		9	2	9	9	9	9	9	2	2
1,3-Dichlorobenzene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
	9		0000		Ş	Ş	Ş	Q	9	2	9	9	9
1,4-Dichlorobenzene (1)	EPA 8010	6/6n	0,0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
	0109		4100.0		S	9	9	2	9	2	2	2	9
Dichlorodifluoromethane (1)	EPA 8010	5/6n	0,0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
	0.00	, ,	0 0025		Ş	Ş	Ş	9	2	Ð	9	9	2
1,1-Dichloroethane (t)	EPA 8010	6/6n	0.0025		S E	S E	S S	NEG I	NEG	NEG	NEG	NEG	NEG
1, 1-Dichloroethane (s)	EFA 8010	6/6n	0,000		2	}	}	ļ					
1 2-Dick occuphans (+)	FPA 8010	ua/a	0,0022		2	ð	9	9	2	2	9	9	2
1,2-Dichloroethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG NEG	NEG	N EG	NEG NEG	Sen	NEG
(*)	5PA 8010	0/01	0.0025		9	9	9	9	9	2	2	9	9
1,1-Dichloroethene (s)	EPA 8010	6/6n	0,0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG SEG	NEG	NEG
(4) 0004400000 (40 10 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0	FPA 8010	0/011	0.0021		9	9	9	Q	9	9	9	Ş	2
trans-1,2-Dichloroethene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1 2-01-04-1-04-1-04-1-0-1-0-1-0-1-0-1-0-1-0	FPA 8010	מין ש	0.0010		9	9	2	Q	9	2	9	9	2
1,2-Dichloropropane (s)	EPA 8010	6/6n	0,0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	SBN	NEG
() an and section 1 de l'est ()	6PA 8010	0/01	0.0048		Q	Ş	Q	9	2	9	Ş	2	2
cis-1,3-Dichloropropene (s)	EPA 8010	6/6n	0,0048		NEG	NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG

Duiuth IAP - Soil Samples Second Column Confirmations

Parameter	Po the	Units	Detection Limit	Field#: Site :	GW2-E 15-16.5 TW0	55-2A TWO	SS-28	SS-2C TWO	83-A 0-1.5 THREE	83-A 2,5-4 THREE	83-A 5-6.5 THREE	83-8 0-1.5 THREE	83-8 2,5-4 THREE
Purgaable Halocarbons (cont.)	EPA 8010	6/6n	ğ										
1,2-Dichlorobenzene (f)	EPA 8010	6/6n	0,0014		ð	9	Ş	2	2	9	2	g	Q
1,2-Dichlorobenzene (s)	EPA 8010	6/6n	0,0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	6/6n	0,0021		Ş	Ş	Q.	Q	2	9	2	2	9
1,3-Dichiorobenzene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG	98 N	NEG	NEG
1,4-Dichlorobenzene (+)	EPA 8010	6/6n	0.0020		ð	ર	ð	9	2	9	2	2	2
1,4-Dichlorobenzene (s)	EPA 8010	6/6n	0,0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	6/6n	0.0016		9	Ş	Ð	ð	9	9	9	2	2
Dichlorodifiuoromethane (s)	EPA 8010	6/6n	0,00 16		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N BB	NEG
1.1-Dichloroethane (f)	EPA 8010	6/bn	0.0025		9	2	2	2	Ð	9	0.005	2	2
1,1-0ichloroethane (s)	EPA 8010	6/6n	0,0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	98 N	NEG
1,2-Oichioroethane (f)	EPA 8010	6/bn	0,0022		9	9	g	9	2	9	9	2	9
1,2-Dichioroethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	N BC	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (+)	EPA 8010	6/61	0,0025		9	g	9	9	ð	9	9	Q	2
1,1-Dichloroethene (s)	EPA 8010	6/60	0,0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	6/6n	0.0021		2	QN	Q	Q	Q	9	9	2	2
trans-1,2-Dichloroethene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichioropropane (f)	EPA 8010	6/gn	0.0010		2	Ş	Q	9	2	9	9	2	S
1,2-Dichloropropane (s)	EPA 8010	6/6n	0,0000		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cirl.3-Dichioropropene (+)	EPA 8010	6/6n	0.0048		9	9	9	9	9	9	9	ð	2
cis-1,3-Dichloropropene (s)	EPA 8010	6/6n	0,0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	99 _N	NEG

H-148

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duiuth IAP - Soil Samples
Second Column Confirmations

	4	- - -	Detection timit	F101d #:	83-8 5-6,5 THREE	83-C 0-1.5 THREE	83-C 2.5-4 THREE	83-C 5-6.5 THREE	83-C 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-0 5-6.5 THREE	SS-3A THREE
5 - 2 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -			9										
Purgeable Halocarbons (cont.)	EPA 8010	6/6n	1										,
1 2-01ch(orobenzene (f)	EPA 8010	0/00	0.0014		9	욧	S	9	9	9	2	Ş	Ş
1,2-Dichlorobenzene (s)	EPA 8010	6/6n	0,0014		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NE6
					4	ţ	ç	9	ş	9	ş	Ş	Ş
1.3-Dichlorobenzene (f)	EPA 8010	6/6n	0,0021		9	₹	⊋	2	€	2	2	2 1	9 (
1,3-Dichlorobenzene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG NEG	z EC	NEG	NEG
	0100	0,0:	0,000		Ş	2	9	9	2	9	9	Ð	9
1,4-UICHIOTOBAZENE (1)	FPA 8010	5/6 n	0,0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NBS	NEG
		n h											
	EPA 8010	0/01	0.0016		9	9	Q	9	9	9	9	9	9
Dichiocodi ti uordmetnane (1)	FPA 8010		0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG SEG	NEG
		n ĥ											
() Considerate of the Constant	FPA 8010	10/01	0.0025		9	2	Ş	2	9	9	2	Q	0.016
	EPA 8010		0,0025		NEG	NEG	NEG	NEG	NEG	SE SE	NEG	NEG	SO.
		n ñ	•										
	0108 403	מ/טוי	0.0022		2	ᢓ	9	Ð	9	2	9	⊋	Q
1,2-Utchlocoethane (s)	EPA 8010	5/5n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
)											
	FPA AUTO	0/011	0.0025		9	身	9	9	9	9	2	2	0,0075
1,1-Dichloroethene (s)	EPA 8010	6/6n	0,0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	Pos
		7	.000		Ş	Ş	GN	9	9	2	2	2	0.14
trans-1,2-Dichloroethene (1)	EPA 8010	6/6n	0,0021		NEG	N EG	NEG	NEG	NEG	NEG	NEG	N EG	POS
75 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		,											
	FPA A010	0/01	0,0010		9	9	Q	2	9	Ð	2	2	9
1.2-Dichloropropane (s)	EPA 8010	6/6n	0,0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	9 9	NEG
											•	!	9
ciel 3-Dichloromogne (f)	EPA 8010	b/bn	0.0048		2	윷	2	2	2	2	2	⊋ {	⊋ 9
cis-1,3-Dichloropropane (s)	EPA 8010	6/6n	0,0048		NEG	NEG	NEG	NEG	NEG	Z EC	NEC	SH	NE S

"ND" indicates that the parameter was not detected.

DATACHEN ANALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

Parameter	Ne thod	Un 1 ts	Detection Limit	Field #: Site :	SS-38 THREE	SS-3C THREE	84-C 2.5-4 FOUR	5-6.5 FOUR	7.5-9 Four	84-D 2,5-4 FOUR	84-0 5-6.5 FOUR	84-D 7.5-9 FOUR	84~E 2.5~4 FOUR
Purgeable Helocarbons (cont.) 1,2-Dichlorobenzene (†) 1,2-Dichlorobenzene (5)	EPA 8010 EPA 8010 EPA 8010	6/6n 6/6n	MDL 0.0014 0.0014		ND NEG	N NEG	ND NEG	NEG	ON NEG	QN 99	O SE	S SS	NE G
1,3-Dichi orobenzene (†)	EPA 8010 EPA 8010	6/6n 6/6n	0.0021		NEG NEG	NEG NO	ND NEG	ND NEG	NEG NE	NEG NEG	NEG NEG	2 8	NEG NEG
1,4-Dichi arobenzene (f)	EPA 8010 EPA 8010	6/6n 6/6n	0,0020		O S	N SS	S S S	O S	NEG NEG	NEG NO	NEG NEG	N KEG	ND
Dichlorodifluoromethane (f)	EPA 8010 EPA 8010	6/6n 6/6n	0,0016		NEG	NEG NEG	S S	NEG NEG	NEG NE	N EG	NEG PO	NEG PO	G &
i,1-Dichloroethane (f)	EPA 8010 EPA 8010	6/6n 6/6n	0,0025		0.033 POS	N EG	ND NEG	NEG NEG	NEG NEG	N EG	NEG NEG	99 N	NEG O
1,2-Dichloroethane (f) 1,2-Dichloroethane (s)	EPA 8010 EPA 8010	6/6n 5/6n	0,0022		N EG	ON NO	NEG NEG	NEG NEG	NEG NEG	NEG NO	9 99	S S	NEG S
1,1-Dichloroethene (f) 1,1-Dichloroethene (s)	EPA 8010 EPA 8010	6/6n 6/6n	0.0025		0,018 POS	NEG NEG	NEG NEG	NEG NEG	NEG NEG	S S	N G	NEG NEG	S S S
trans-1,2-Dichloroethene (t) trans-1,2-Dichloroethene (s)	EPA 8010 EPA 8010	6/6n 6/6n	0.0021		0.0029 Pos	NEG PO	Z Z	NEG NEG	2 9	NEG NE	NEG NE	O SB !	S NE C
1,2-Dichloropropane (f) 1,2-Dichloropropane (s)	EPA 8010 EPA 8010	6/6n 6/6n	0,0010		ND NEG	NEG NEG	NEG	NEG NO	NEG NE	N EG	9 8	2 2 2	₹ 8 8
cis-1,3-0ichloropropene (f) cis-1,3-0ichloropropene (s)	EPA 8010 EPA 8010	6/6n 5/6n	0.0048		N EG	N PO	ND NEG	N NO	N K EG D	2 9	S S S	2 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	NEG

DATACHEN AWALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

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Parameter	Method	Un its	Detection Limit	Field#: Site :	84-E 5-6.5 FOUR	GW4-A 10-11.5 FOUR	6W4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	5-6.5 FOUR	2.5-4 FOUR	84-A 5-6.5 FOUR	84-A 7.5-9 FOUR	84-8 2,5-4 FOUR
Purgable Halocarbons (cont.)	EPA 8010 EPA 8010	6/6n	MDL 0,0014		2	Ð	2	9	2	2	9 9	2 5	9 4
1,2-Dichlorobenzene (s)	EPA 8010		0.0014		NEG	NEG	NEG NEG	NEG P	9 9 9 9		9 9	A 9	<u> </u>
1,3-Dichlorobenzene (f) 1,3-Dichlorobenzene (s)	EPA 8010 EPA 8010	6/6n	0,0021		S S	N KE	<u>8</u> 8	NEG NEG	NEG E	NEG G	NEG	NEG	NEG
1 A_D chlorobanzana (f)	EPA 8010	6/6n	0,0020		9	9	9	Q	2	2	9 (9 5	S S
1,4-Dichlorobenzene (s)	EPA 8010	6/6n	0,0020		NEG	NEG	99 99 99	N EC	N EG	NEG NEG	SEC	2	ם עם
	OTON ACI	0/01	0.0016		2	9	9	9	9	9	웆	2	9
Dichlorodifluoromethane (1)	EPA 8010	6/6n	0,0016		NEG	NEG NEG	NEG	NEG	NEG	NEG	NEG	S	WEG
	0108 801	0/01	0.0025		Ð	Ş	2	9	9	2	2	9	2
1,1-Dichloroethane (1) 1,1-Dichloroethane (s)	EPA 8010	6/6n	0,0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	9	NEG
:	0108	0/0::	0 0022		9	Ð	g	Q	2	2	2	9	9
1,2-Dichloroethane (t)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	8.50 0.30 0.30 0.30 0.30 0.30 0.30 0.30 0	NEG	NEG NEG	N EG
:	0100	0,00	0.00%		9	9	2	9	9	9	2	9	Ð
i,i-Dichloroethene (1) i,i-Dichloroethene (s)	EPA 8010	6/6n	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	9 2	NEG
	0100	0,0:	0 0021		Ş	9	9	9	9	9	2	2	ð.
trans-1,2-Dichloroethene (1) trans-1,2-Dichloroethene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG EG	NEG	99 ×	NEG
	0108 801	0,00	0.0010		5	Q	Ą	2	2	2	æ	₽	2
1,2-Dichloropropane (1) 1,2-Dichloropropane (s)	EPA 8010	6/6n	0,0010		NEG	NEG	NEG	NEG	N EG	S S S	NEG NEG	88	יי אני אני
	FD4 8010	0/01	0.0048		2	9	9	9	2	2	2	2	2 ;
cis-1,3-Dichioropropene (s)	EPA 8010	6/6n	0.0048		NEG	NEG	NEG N	N EG	NEG	N EG	NEG NEG	SB SB	NEG NEG

DATACHEM AWALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

					B4-8	84-B					G#5-A	GW5-B
			Detection	Field #:		7.5-11.5	SS-4A	SS-4B	SS-4C	SS-4D	5-6.5	9.5-11
Parameter	Method	Un I+s	Limit	SI te :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FIVE	FIVE
Purgeable Halocarbons (cont.)	EPA 8010	6/6n	MDL									
1,2-Dichlorobenzene (f)	EPA 8010	6/6n	0,0014		9	2	9	9	9	9	2	9
1,2-Dichlorobenzene (s)	EPA 8010	6/6n	0.0014		NEG	N EG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-01chlarobenzene (f)	EPA 8010	6/6n	0,0021		2	9	Q	9	9	9	9	2
1,3-Dichlorobenzene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG	N 88	NEG
1,4-Dichlorobenzene (†)	EPA 8010	6/6n	0.0020		9	₽	9	2	Ş	9	9	9
1,4-Dichlorobenzene (s)	EPA 8010	6/6n	0,0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	6/6n	0.0016		2	Q	9	9	2	2	9	9
Dichlorodifluoromethane (s)	EPA 8010	6/6n	0,0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	6/6n	0.0025		2	9	2	2	9	9	2	9
1,1-Dichloroethane (s)	EPA 8010	6/6n	0,0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	6/6n	0,0022		2	Q	2	2	9	2	9	£
1,2-Dichloroethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	N BS	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	6/60	0.0025		9	2	9	2	9	2	9	9
1,1-Dichloroethene (s)	EPA 8010	6/6n	0,0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	6/gu	0.0021		QN	Q	9	9	9	9	9	2
trans-1,2-Dichloroethene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	6/6n	0,0010		9	S	9	9	2	9	2	2
1,2-Dichloropropane (s)	EPA 8010	6/6n	0,0010		NEG	NEG	NEG	N ES	NEG	NEG	NEG	NEG
cls-1,3-Dichloropropene (f)	EPA 8010	b/bn	0,0048		9	9	Q	2	2	9	9	9
cis-1,3-Dichloropropene (s)	EPA 8010	6/6n	0,0048		NEG	NEG	NEG	NEG	NEG	NEG	N BG	NEG

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Duluth 1AP - Soli Samples
Second Column Confirmations

86-A 86-B 2.5-4 0-1.5 SIX SIX	ND ND ND NEG NEG	ND ND NEG NEG	NO NO NEG	ND ND NEG NEG	ND ND NEG NEG	ND ND NEG NEG	_		ND ND NEG	QN QN
0-1-5 S1X	N N	S S	NEG N	S S	S SS N	NEG 6	S S	NEG NO	NEG NEG	9
SS-5E FIVE	Se &	ND NEG	ND	NEG NO	G S	N S	NEG P	N EG	NEG N	9
SS-50 FIVE	ND NEG	ND NEG	NEG 16	N EG	S S S S S S S S S S S S S S S S S S S	9 9	NEG N	ND NEG	NEG NO	9
SS-5C FIVE	ND NEG	NEG NEG	S S	O SH	NEG NEG	NEG	NEG NEG	NEG NEG	N NO	9
SS-58 F1VE	N SE	N NO	N EG	NEG P	NEG N	NEG N	ND NEG	ND NEG	NEG NEG	Ð
SS-5A FIVE	ND	ND NEG	NEG NEG	NEG NEG	NEG NO	N CO	ND	NEG	NEG NEG	Ð
GW5-C 10-11.5 FIVE	NEG NEG	ND NEG	NEG NO	ND NEG	ND	NEG NEG	NEG NO	NEG NEG	ND	9
Field #: Site :										
Detection Limit	0.0014	0,0021 0,0021	0,0020 0,0020	0.0016 0.0016	0.0025 0.0025	0.0022 0.0022	0,0025 0,0025	0.0021	0,0010	0.0048
Units ug/g	6/6n 6/6n	6/6n 6/6n	6/6n 6/6n	6/6n 5/6n	6/6n 6/6n	6/6n	6/6n 6/6n	6/6n 6/6n	6/6n 6/6n	6/6n
Method EPA 8010	EPA 8010 EPA 8010	EPA 8010 EPA 8010	EPA 8010 EPA 8010	EPA 8010 EPA 8010	EPA 8010 EPA 8010	EPA 8010 EPA 8010	BPA 8010 EPA 8010	EPA 8010 EPA 8010	EPA 8010 EPA 8010	EPA 8010
Parameter Purgeable Halocarbons (cont.)	1,2-Dichlorobenzene (f) 1,2-Dichlorobenzene (s)	1,3-Dichlorobenzene (f) 1,3-Dichlorobenzene (s)	1,4-Dichlorobenzene (f) 1,4-Dichlorobenzene (s)	Dichlorodifiuoromethane (f) Dichlorodifiuoromethane (s)	1,1-Dichloroethane (f) 1,1-Dichloroethane (s)	1,2-Dichloroethane (f) 1,2-Dichloroethane (s)	1,1-Dichloroethene (f) 1,1-Dichloroethene (s)	trans-1,2-Dichloroethene (†) trans-1,2-Dichloroethene (s)	1,2-Dichloropropane (f) 1,2-Dichloropropane (s)	cis-1,3-Dichloropropene (f)

NWD indicates that the parameter was not detected,

Duluth IAP - Soil Samples Second Column Confirmations DATACHEM ANALYTICAL REPORT

			De tect ion	Field #:	B6-8 2,5-4	B7-A 0-1.5	B7-A	B7-B 0-1.5	87-8 2.5-4	GW7-A 10-11 ₅ 5	GW7-B 10-11.5	GW7 -C 15-16.5	SS-7A*
Parameter	Me thod	Units	Limit	Site :	SIX	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN
Purgeable Halocarbons (cont.)	EPA 8010	6/6n	MDL										
1,2-Dichlorobenzene (f)	EPA 8010	6/ 6n	0.0014		₹	2	2	9	9	9	9	9	₹
1,2-Dichlorobenzene (s)	EPA 8010	6/6n	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
1,3-Dichtorobenzene (f)	EPA 8010	6/bn	0.0021		Ş	9	9	2	9	9	9	9	2
1,3-Dichlorobenzene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	6/6n	0,0020		9	2	9	2	₽	9	2	9	2
1,4-Dichlorobenzene (s)	EPA 8010	6/6n	0,0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	6/6n	0.0016		9	9	5	₹	9	9	9	2	Ş
Dichlorodifluoromethane (s)	EPA 8010	6/6n	0,0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	b/bn	0.0025		£	9	2	2	2	9	2	9	2
1,1-Dichloroethane (s)	EPA 8010	6/6n	0,0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	6/bn	0.0022		2	Ş	Ş	ð	S	9	2	9	0.0070
1,2-Dichloroethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	N BG	NEG	POS
1,1-Dichloroethene (f)	EPA 8010	6/6n	0,0025		2	9	9	2	2	9	£	9	9
1,1-Dichloroethene (s)	EPA 8010	6/6n	0,0025		NEG	NEG	NEG	NEG	NEG	NBG	NEG	NEG	NEG
trans-1,2-Dichioroethene (f)	EPA 8010	6/bn	0.0021		9	2	Ş	9	9	9	₽	9	0.024
trans-1,2-Dichloroethene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	SOS
1,2-Dichloropropane (f)	EPA 8010	6/6n	0,0010		Ž	9	9	Ş	9	2	2	2	9
1,2-Dichloropropane (s)	EPA 8010	6/6n	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	6/6n	0.0048		Q	2	2	⊋	2	2	9	9	9
cis-i,3-Dichloropropene (s)	EPA 8010	6/6n	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

* Revised 07/10/87

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DATACHEN ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter Purgeable Halocarbons (cont.) 1,2-Dichlorobenzene (f) 1,3-Dichlorobenzene (f) 1,3-Dichlorobenzene (f) 1,4-Dichlorobenzene (f) 1,4-Dichlorobenzene (f) Dichlorodifluoromethane (f) Dichlorodifluoromethane (f)	EPA 8010	271 ny 19/9 19/9 19/9 19/9 19/9	Detection Limit 0,0014 0,0014 0,0021 0,0021 0,0020 0,0020	S + 0 0 + 1 S	BB-A O-1-5 ELGHT ND NEG NEG NEG NEG NEG	88-A 2.5-4 E.041 NG NG NG NG NG NG	B8-A 5-6.5 E1GHT ND NEG ND NEG ND NEG ND	BB 48 0-1.5 E E G4T ND NEG ND ND ND ND ND ND ND ND ND ND ND ND ND	BB 48 2,5-4 E1G4T ND ND NEG NEG NG	88 48 5 16 16 14 14 14 14 14 14 14 14 14 14 14 14 14	GWB-A 5-6.5 ELIGHT ND ND ND ND ND ND ND ND ND ND ND ND ND	948-4 10-11,5 ND NEG	GWB-C 10-11,5 E1GAT ND NEG ND NEG ND NEG ND NEG ND NEG
1,1-Dichloroethane (1) 1,1-Dichloroethane (s) 1,2-Dichloroethane (t) 1,2-Dichloroethane (s)	EPA 8010 EPA 8010	6/6n 6/6n 6/6n	0,0025 0,0022 0,0022		NEG ND NEG	NEG ND NEG	NEG NEG NEG	NEG NEG NEG	NEG NEG	NEG ND NEG	N N N N N N N N N N N N N N N N N N N	N G N G N G N G N G	NEG ND NEG
1,1-Dichloroethene (f) 1,1-Dichloroethene (s)	EPA 8010 EPA 8010	6/6n 6/6n	0,0025		NEG NO	N EG	ND NEG	NEG NEG	NEG N	N PC	N NEG	S S S	NEG NO
trans-1,2-Dichloroethene (f) trans-1,2-Dichloroethene (s)	EPA 8010-	6/6n 6/6n	0,0021		NEG NEG	N G	NEG PO	2 9	NEG 35	NEG N	2 g	2 9	NEG WE
1,2-Dichlaropropane (f) 1,2-Dichlaropropane (s)	EPA 8010 EPA 8010	6/6n 6/6n	0.0010		N EG	N EG	NEG NEG	NEG NEG	NEG NO	N EG	9 99 9 99	N S N	NEG NEG
cis-1,3-Dichloropropene (f) cis-1,3-Dichloropropene (s)	EPA 8010 EPA 8010	6/6n 6/6n	0.0048		N EG	N NEG	N N N N	NEG NEG	N EG	N EG	2 8	2 98	NEG N

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

			Detect ion	Field #:	\$5-8A*	SS-8B*	
Parameter	Method	Un 1 ts	Limit		E1GHT	EIGHT	
Purgeable Halocarbons (cont.)	EPA 8010	6/6n	MDL				
1,2-Dichiorobenzene (f)	EPA 8010	6/6n	0.0014		9	QN	
1,2-Dichiorobenzene (s)	EPA 8010	6/6n	0,0014		NEG	NE G	
1,3-Dichlorobenzene (f)	EPA 8010	6/60	0,0021		9	Q	
1,3-Dichlorobenzene (s)	EPA 8010	6/6n	0,0021		NEG	NEG	
1,4-Dichtorobenzene (f)	EPA 8010	6/6n	0,0020		9	Q	
1,4-Dichlorobenzene (s)	EPA 8010	6/6n	0.0020		NEG	NEG	
Dichlorodifluoromethane (f)	EPA 8010	6/6n	0,0016		9	Q	
Dichlorodifiuoromethane (s)	EPA 8010	6/6n	0,0016		NEG	NEG	
1,1-Dichioroethane (f)	EPA 8010	6/6n	0,0025		9	Q	
1,1-Dichloroethane (s)	EPA 8010	6/6n	0,0025		NEG	NEG	
1.2-Dichloroethane (f)	EPA 8010	6/60	0,0022		9	S	
1,2-Dichloroethane (s)	EPA 8010	6/6n	0.0022		NEG	NEG	
1,1-Dichloroethene (f)	EPA 8010	6/6n	0,0025		2	9	
1,1-Dichloroethene (s)	EPA 8010	6/6n	0,0025		NEG	NEG	
trans-1,2-Dichloroethene (f)	EPA 8010	g/gn	0,0021		2	Ð	
trans-1,2-Dichloroethene (s)	EPA 8010	6/6n	0.0021		NEG	NEG	
1,2-Dichloropropane (f)	EPA 8010	6/6n	0,0010		9	⊋	
1,2-Dichloropropane (s)	EPA 8010	6/6n	0,0010		NEG	NEG	
cis-1,3-Dichloropropene (f)	EPA 8010	6/6n	0,0048		9	9	
cis-1,3-Dichlorapropene (s)	EPA 8010	6/6n	0,0048		NEG	NEG	

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DATACHEA ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Centirmations

				;	B1-A	81-A	81-A	GW1-A	94.1-B	GW1-E	:	•	82-8
Parameter	Me thod	Un I ts	Defection Limit	Field #: Site :	ONE ONE	ONE P	ONE ONE	ONE ONE	ONE 3	0NE	ONE	ONE ONE	140
Purgeable Halocarbons	EPA 8010	6/6n	렆										
trans-1,3-Dichloropropene (f)	EPA 8010	6/6n	0,0048		2	9	9	9	9	2	2	₽	9
trans-1,3-Dichloropropene (s)	EPA 8010	6/60	0,0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N BG	NEG
We thy lene Chloride (f)	EPA 8010	b/bn	0,0017		æ	Ş	오	9	2	2	9	2	9
Methylene Chloride (s)	EPA 8010		0,0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrach croethane (f)	EPA 8010	6/60	0,0019		£	9	2	9	9	2	9	9	9
1, 1, 2, 2-Tetrachloroethane (s)	EPA 8010		0,0019		NEG	NEG	NEG	NEG	NEG E	NEG	NEG	N SB	NEG
Tetrachioroethene (f)	EPA 8010	5/ 5 n	0,0019		2	ð	9	9	9	9	2	9	₽
Teirach!oroethene (s)	EPA 8010	6/6n	610000		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichioroethane (f)	EPA 8010	6/6n	0,0026		2	9	9	9	2	2	£	2	9
1,1,1-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichioroethane (f)	EPA 8010	6/6n	0,0026		9	9	2	9	9	9	9	2	9
1,1,2-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	6/6n	0,0030		9	2	Ð	9	2	9	2	9	9
Trichloroethene (TCE) (s)	EPA 8010	6/6n	0,0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	6/60	0,0022		2	ð	Ð	2	9	2	9	9	身
Trichlorofluoromethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	N EG	9	NEG
Vinyt Chloride (f)	EPA 8010	6/60	0,0027		9	2	9	9	9	9	9	9	9
Vinyi Chloride (s)	EPA 8010	6/6n	0,0027		NEG	NEG	NEG	NEG NEG	NEG	NEG	NEG	NEG	NEG

DATACHBA ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

			Patact los	Field #:	82-8	82-8 5-6.5	B2-C	82-C	82-c	GW2-A	GW2-B	GW2-C	GW2-0 15-16.5
Parameter	Me tho d	u its	Limit	Site :	OF E	OM	150 0	0	OM.	OM M	TWO	140	TWO
Purgeable Halocarbons (cont)	EPA 8010	6/6n	ᅜ										
trans-1,3-Dichloropropene (f)	EPA 8010	6/60	0.0048		9	2	9	9	9	9	9	2	9
trans-1,3-Dichloropropene (s)	EPA 8010		0,0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
He thy lene Chioride (f)	EPA 8010	6/6n	0,0017		9	9	9	9	2	9	2	2	9
Methylene Chloride (s)	EPA 8010		0,0017		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
1,1,2,2-Tetrachioroethane (f)	EPA 8010	6/bn	0,0019		9	9	9	9	9	9	9	2	9
1,1,2,2-Tetrachloroethane (s)	EPA 8010		0,0019		NEG	NEG	NEG	NEG	NEG	NEG	N BG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	6/6n	0,0019		2	2	9	2	2	9	2	2	9
Tetrachloroethene (s)	EPA 8010		0,0019		NEG	N EG	NEG	N BG	NEG	NEG	N BG	NEG	NEG
1,1,1-Trichioroethane (f)	EPA 8010	6/bn	0,0026		2	9	2	2	2	9	2	9	₽
1,1,1-Trichloroethane (s)	EPA 8010		0,0026		NEG	NEG	NEG	NEG	NEG	NEG	N BG	NEG	NEG
1,1,2-Trichioroethane (f)	EPA 8010	6/bn	0,0026		2	Ş	9	9	9	9	2	9	2
1,1,2-Trichioroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	N EG	N BG	NEG	NEG	SB N	SBS	NEG
Trichloroethene (TCE) (f)	EPA 8010	6/6n	0,0030		£	Q	2	9	2	9	2	2	2
Trichloroethene (TCE) (s)	EPA 8010		0,0000		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	6/6n	0,0022		2	9	S	9	9	9	9	9	9
Trichlorofluoromethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEC	NEG	98 80	NEG	NEG NEG
Vinyl Chloride (f)	EPA 8010	b/bn	0,0027		9	Ð	Ð	2	2	2	2	9	9
Vinyi Chloride (s)	EPA 8010		0,0027		NEG NEG	NEG	NEG	SB SB	NEG	NEG	88	N BC	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

					GW2-E				B3-A	B3-A	B3-A	83-8	83-8
			Detection	Field #:	15-16.5	SS-2A	SS-2B	SS-2C	0-1-5	2.5-4	5-6.5	0-1-5	2.5-4
Parameter	Me thod	Units	Limit	Si te :	OWL	OML	OML	TWO	THREE	THREE	THREE	THREE	THREE
Purgeable Helocarbons (cont)	EPA 8010	6/6n	Ā										
trans-1,3-Dichloropropene (f)	EPA 8010	6/6n	0.0048		£	9	9	2	9	9	9	9	9
trans-1,3-Dichloropropene (s)	EPA 8010	6/6n	0,0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	6/6n	0.0017		9	9	2	9	9	2	9	9	9
Methylene Chloride (s)	EPA 8010	6/6n	0,0017		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	6/6n	0,0019		9	QN	Q	2	9	2	2	Q	9
1,1,2,2-Tetrachloroethane (s)	EPA 8010	6/6n	0,0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	6/6n	0.0019		9	9	9	£	0,0076	9	9	9	9
Tetrachloroethene (s)	EPA 8010	6/6n	0,0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	6/6n	0.0026		g	9	2	2	90000	0,017	0,083	ş	9
1,1,1-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	NEG	POS	POS	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	6/6n	0.0026		9	9	2	Q	9	9	9	9	Ð
1,1,2-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	9 <u>.</u> 2	NEG	NEG	NEC S	S RC	NEG
Trichloroethene (TCE) (f)	EPA 8010	6/6n	0,0030		2	Q	Q	9	9	2	2	Q	9
Trichloroethene (TCE) (s)	EPA 8010	6/6n	0,0030		NEG	NEG	NEG	NEG NEG	NEG	NEG	N	SB RBC	NEG
Trichlorofluoromethane (1)	EPA 8010	6/6n	0,0022		9	Q	9	9	2	9	9	9	2
Trichlorofluoromethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	S E	NEG	NEG
Vinyl Chloride (f)	EPA 8010	6/60	0,0027		9	9	9	9	2	9	9	Ð	9
Vinyi Chior ide (s)	EPA 8010	6/6n	0,0027		NEG	NEG	NEG	NEG	NEG	NEG	SE SE	S R	NEG

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Semples
Second Column Confirmations

					, a	AC.	83-C	83-C	B.ZC	A-X-Y	G-5-6	GW3-0	
			Detect Ion	Field #:	5-6.5	0-1-5	2.5-4	5-6.5	5-6.5	5-6.5	5-6.5	5-6.5	SS-3A
Parameter	Me thod	Units	Limit	Site :	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE
Purgeable Halocarbons (cont)	EPA 8010	6/6n	đ										
trans-1,3-Dichloropropene (f)	EPA 8010	6/bn	0.0048		9	9	9	2	9	9	2	9	9
trans-1,3-Dichloropropene (s)	EPA 8010	6/6n	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Hethylene Chloride (+)	EPA 8010	6/6n	0.0017		9	Q	Q	0,0085	2	9	2	2	9
Hethylene Chlaride (s)	EPA 8010	6/6n	0,0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (+)	EPA 8010	6/6n	0.0019		9	9	9	9	9	9	2	2	2
1, 1, 2, 2-Tetrachioroethane (s)	EPA 8010		0,0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
Tetrachloroethene (f)	EPA 8010	6/6n	0,0019		2	9	Ş	9	0,38	9	2	9	2
Tetrachioroethene (s)	EPA 8010	6/6n	610000		NEG	NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG
1,1,1-Trichioroethane (f)	EPA 8010	b/bn	0,0026		2	9	9	9	2	2	9	9	0,0042
1,1,1-Trichloroethene (s)	EPA 8010	6/6n	0,0026		N EG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
1,1,2-Trichloroethane (f)	EPA 8010	6/6n	0,0026		Ş	Q	9	2	2	9	9	2	9
1,1,2-Trichioroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	× EG	NEG	NEG	99 N	NEG
Trichloroethene (TCE) (f)	EPA 8010	6/6n	0,0030		₽	9	9	9	9	9	9	9	0,010
Trichloroethene (TCE) (s)	EPA 8010	g/gu	0,0030		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	Pos
Trichlorofluoromethane (f)	EPA 8010	6/6n	0.0022		2	2	윷	9	9	9	9	9	Q
Trichlorofluoromethane (s)	EPA 8010	6/60	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	99 99	NEG
Vinyl Chloride (f)	EPA 8010	6/6n	0,0027		2	2	9	9	9	9	9	9	0.027
Vinyi Chioride (s)	EPA 8010	6/6n	ug/g 0,0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS

DATACHEM AMALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

							84-C	4	₽ 4	84-D	84-0 -	B4-0	84-E
			Detection	Field #:	88-38	SS-3C	2.5-4	5-6.5	7.5-9	2.5-4	5-6.	7.5-9	2.5-4
Parameter	Me thod	ults	Limit	Site :	THREE	THREE	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgeable Helocarbons (cont)	EPA 8010	6/6n	호										
trans-1,3-Dichloropropene (f)	EPA 8010	6/6n	0,0048		9	2	9	9	9	Q	9	9	9
trans-1,3-Dichloropropene (s)	EPA 8010	6/6n	0,0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Hethylene Chloride (f)	EPA 8010	6/6n	0,0017		9	9	0,062	0.10	0.40	0,082	0,33	0.15	9
Methylene Chloride (s)	EPA 8010	6/6n	0.0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (1)	EPA 8010	6/6n	0,0019		9	9	9	Q	9	9	9	9	9
1,1,2,2-Tetrachloroethane (s)	EPA 8010	6/6n	0,0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N BC	NEG
Tetrachloroethene (f)	EPA 8010	6/bn	0,0019		0,0019	9	9	9	9	9	9	9	9
Tetrachloroethene (s)	EPA 8010	6/6n	0,0019		POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	6/60	0.0026		1.5	0.013	2	9	9	9	9	9	2
1,1,1-Trichloroethane (s)	EPA 8010		0,0026		Pos	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	6/6n	0,0026		9	9	9	9	2	9	9	9	9
1,1,2-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	6/6n	0,0030		0,026	0,0053	Q	9	9	9	9	9	9
Trichloroethene (TCE) (s)	EPA 8010	6/6n	0,0030		P0S	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	6/6n	0.0022		S	9	ð	9	9	9	9	9	2
Trichlorofluoromethane (s)	EPA 8010	6/60	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Viny! Chloride (f)	EPA 8010	6/6n	0,0027		2	2	9	9	9	9	9	9	9
Vinyi Chloride (s)	EPA 8010	6/6n	0,0027		NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG	NEG

DATACHEN ANALYTICAL REPORT
Duluth IAP - Soil Samples
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					84-E	GW4-A	GW4-B	S#4-C	G#4-D	84-A	84-A	B4-A	84-8
			Detection	Fleid #:	5-6.5	10-11.5	5-6.5	10-12	5-6.5	2,5-4	5-6.5	7.5-9	2.5-4
Parameter	Me thod	Un I ts	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgeable Halocarbons (cont)	EPA 8010	6/6n	₩D.										
trans-1,3-Dichioropropene (f)	EPA 8010	6/6n	0.0048		2	9	2	9	9	9	9	9	9
trans-1,3-Dichloropropene (s)	EPA 8010	6/6n	0,0048		NEG	N EG	NEG	NEG	NEG	NEG	NEG	N BG	NEG
Hethylene Chloride (f)	EPA 8010	6/6n	0,0017		2	2	2	2	0.079	9	9	9	9
Methylene Chloride (s)	EPA 8010	6/6n	0,0017		NEG	NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	6/6n	0,0019		9	2	2	9	9	9	2	ð	9
1, 1, 2, 2-Tetrachloroethane (s)	EPA 8010	6/6n	0,0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	6/6n	0,0019		2	9	0.013	9	2	2	9	2	9
Tetrachioroethene (s)	EPA 8010	6/6n	0,0019		NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	6/6n	0,0026		ð	2	2	2	9	9	9	Ð	9
1,1,1-Trichloroethane (s)	EPA 8010	6/6n	970000		NEG	NEG	NEG	NEG	NEG	NEG	99 99 89	NEG N	NEG
1,1,2-Trichloroethane (f)	EPA 8010	6/gu	0,0026		9	9	9	S	2	9	Š	9	9
1,1,2-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlaroethene (TCE) (f)	EPA 8010	6/6n	0,0030		9	9	9	9	9	9	9	9	9
Trichloroethene (TCE) (s)	EPA 8010	6/6n	0,0030		N ES	NEG	NEG	NEG	NEG NEG	NEG	N EG	NEG	NEG
Trichlorofiuoromethane (f)	EPA 8010	6/6n	0,0022		9	9	2	2	2	Ş	9	9	9
Trichlorofluoromethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
Vinyi Chloride (f)	EPA 8010	6/6n	0,0027		2	2	9	9	2	Ş	9	9	9
Vinyi Chioride (s)	EPA 8010	6/6n	0,0027		NEG	NEG	NEG	NEG	NEG	NEG	N 88	NEG	NEG

DATACHEM AMALYTICAL REPORT
Duluth IAP - Soil Samples
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					84-8	84-8					(345 A	, 5 M
			Detect Ion	Fleid #:	5-6.5	7.5-11.5	SS-4A	SS-4B	SS-4C	SS-40	 	0 5-11
Parameter	Me thod	Un its	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FIVE	FIVE
Purgeable Halocarbons (cont)	EPA 8010	6/6n	M)									
trans-1,3-Dichloropropene (f)	EPA 8010	6/6n	0,0048		9	2	9	9	9	2	9	Ş
trans-1,3-Dichloropropana (s)	EPA 8010	6/6n	0,0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	6/6n	0,0017		9	9	9	9	9	£	Ş	Ş
Methylene Chloride (s)	EPA 8010	6/6n	0,0017		NEG	NEG	NEG	NEG	NEG	NEG	9 9	NEG E
1,1,2,2-18 tr ach loroethane (f)	EPA 8010	6/6n	0,0019		2	9	2	9	2	2	2	9
1,1,2,2-Tetrachioroethane (s)	EPA 8010	6/6n	0,00 19		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachi oroethene (f)	EPA 8010	6/6n	0,0019		2	2	9	9	2	9	9	Ş
Tetrachloroethene (s)	EPA 8010	6/6n	0.00 19		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichioroethane (f)	EPA 8010	6/6n	0,0026		9	9	9	9	2	9	2	9
1,1,1-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	6/6n	0,0026		9	9	9	2	2	9	9	9
1,1,2-Trichloroethane (s)	EPA 8010	6/6n	0*0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010		0,0030		9	9	9	2	2	9	2	9
Trichloroethene (TCE) (s)	EPA 8010	6/6n	0,0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010		0,0022		2	9	9	9	9	9	9	9
Trichlorofluoromethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (+)	EPA 8010		0,0027		9	g	9	2	9	9	9	Ş
Vinyi Chioride (s)	EPA 8010	6/6n	0,0027		NEG	NEG	NEG	NEG	NEG	NEG	S S S	NEG

DATACHEN ANALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

Parameter	Ne thod	Units	Detection Limit	Field #:	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-58 FIVE	SS-5C FIVE	SS-50 FIVE	SS-SE FIVE	B6-A 0-1.5 SIX	86-A 2.5-4 SIX	86-8 0-1.5 SIX
Purga able Halocarbons (cont) trans-1,3-Dichloropropene (f)	EPA 8010 EPA 8010		MD. 0_0048		N NO	NEG Æ	NEG NEG	2 88 8	A SA	NEG TO	NEG TO	NEG NO	NEG NEG
trans-1,3-Dichloropropene (s) Methylene Chloride (f)	EPA 8010 EPA 8010 EPA 8010	6/6n 6/6n 6/6n	0,0017		N EG	NEG NEG	NEG AD	O S	NEG NEG	A SA	N S S	2 SB	NEG NEG
Methylene Chilorine (5) 1,1,2,2-Tetrachloroethane (5) 1,1,2,2-Tetrachloroethane (5)	EPA 8010 EPA 8010	6/6n 6/6n	0.0019		ND NEG	ND NEG	S S	2	N N N	NEG NEG	S S S	N N N	66 66 66
Tetrachloroethene (f)	EPA 8010 EPA 8010	6/6n 6/6n	0.0019 0.0019		NEG NEG	NEG NEG	Z S	2 99	9 9g	N EG	S SS	NEG S	9 H 2
f, 1, 1-frichloroethane (f)	EPA 8010 EPA 8010	6/6n	0.0026		ND NEG	ND NEG	ND NEG	S S	NEG NE	NEG NO	S 55	2	NEG T
1, 1, 1-fr ichioroethene (1) 1, 1, 2-fr ichioroethene (5) 1, 2-fr ichioroethene (5)	E7A 8010 EPA 8010	6/6n 6/6n	0,0026		NEG NEG	NEG NEG	N EG	NEG NEG	NEG P	S S	NEG NEG	3 3 9	9 9 9
Trichloroethene (TCE) (f) Trichloroethene (TCE) (s)	EPA 8010 EPA 8010	6/6n 5/6n	0,0030		NEG NEG	ND	2 8	S S	NEG S	S S S		2 9	NEG &
Trichlorofluoromethane (f)	EPA 8010 EPA 8010	6/6n 6/6n	0.0022		NEG NEG	NEG NEG	weg	Z S	S S	NEG S	i i i	NEG X	NEG N
Vinyi Chloride (f) Vinyi Chioride (s)	EPA 8010 EPA 8010	6/6n 6/6n	0.0027		N EG	NEG NEG	N EG	9 9 9	5 25 55 55	NEG NEG	Z EG	992	NEG

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DATACHEN ANALYTICAL REPORT
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					B6-8	B7 - A	87 -A	B7-B	87-8	GW7 -A	GW7-B	GW7-C	
			Detection	Field #:	2,5-4	0-1.5	2.5-4	0-1-5	2.5-4	10-11.5	10-11.5	15-16.5	SS-7A*
Parameter	Me thod	Un I ts	Limit	Site :	SIX	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN
Purgeable Halocarbons (cont)	EPA 8010	6/6n	MOL										
trans-1,3-Dichloropropene (f)	EPA 8010	6/6n	0,0048		æ	9	2	9	9	2	9	9	9
trans-1,3-Dichloropropene (s)	EPA 8010	6/6n	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	6/6n	0.0017		Ð	9	2	9	2	9	2	2	Q
Mathylene Chloride (s)	EPA 8010	6/6n	0,0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1.1.2.2-Tetrachloroethane (f)	EPA 8010	b/bn	0,0019		2	9	9	9	9	9	2	9	2
1,1,2,2-Tetrachloroethane (s)	EPA 8010	6/6n	6100*0		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	b/bn	0,0019		* Q	0.0035*	æ	æ	2	9	₽	2	9
Tetrachloroethene (s)	EPA 8010	6/6n	6100*0		NEG*	POS*	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1.1.1-Trichloroethane (f)	EPA 8010	na/a	0.0026		9	9	9	S	2	9	2	æ	2
1,1,1-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1.1.2-Trichloroethane (f)	EPA 8010	0/00	0,0026		2	9	9	9	2	9	2	9	æ
1,1,2-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	b/bn	0,0030		9	9	2	⊋	2	9	2	9	2
Trichloroethene (TCE) (s)	EPA 8010	6/6n	0.0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichiorofiuoromethane (f)	EPA 8010	0/00	0,0022		2	9	9	9	2	9	9	9	Ð
Trichlorofluoromethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Viny! Chloride (f)	EPA 8010	09/0	0,0027		9	ĝ	2	9	9	Ð	2	₽	2
Vinyi Chloride (s)	EPA 8010	6/6n	0,0027		NEG	NEG	NEG	NEG	NEG	N EG	NEG	N S	NEG

* Revised 07/10/87

DATACHEM AWALYTHICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

			Detection	Fladd #:	B8-A	P8-A	88 -A 7-5-5	88-8 2.1-0	88-B	98 to	GW8-A	GW8-B	GW8-C
Parameter	Me thod	Un its	Limit	Site :	EGT	EGHT	EIGHT	EIGHT	EIGHT	EIGHT	EG	EIGHT	EIGHT
Purgeable Halocarbons (cont)	EPA 8010	6/6n	MD.										
trans-1,3-Dichloropropene (†)	EPA 8010	6/6n	0.0048		2	2	9	9	9	9	9	9	9
trans-1,3-Dichloropropene (s)	EPA 8010	6/6n	0,0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	6/6n	0.0017		2		0.0088	0.019	9	9	0,037	0.036	2
Methylene Chloride (s)	EPA 8010	6/6n	0,0017		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
1,1,2,2-Tetrachi oroethane (f)	EPA 8010	6/6n	0.0019		9		9	9	9	9	9	9	9
1,1,2,2-Tetrachioroethane (s)	EPA 8010	6/6n	610000		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	6/6n	0.0019		2	9	9	9	9	ð	9	9	2
Tetrachloroethene (s)	EPA 8010	6/6n	0,0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	SBN	NEG
1,1,1-Trichioroethane (f)	EPA 8010	6/6n	0.0026		2	9	9	9	9	9	9	2	9
1,1,1-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	6/6n	0,0026		2	9	9	Q	2	9	Ð	S	9
1,1,2-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichioroethene (TCE) (f)	EPA 8010	6/6n	0.0030		2	Ğ	9	9	9	9	9	2	9
Trichloroethene (TCE) (s)	EPA 8010	6/6n	0,0030		NEG	NEG	NEG	NEG	N EG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	6/6n	0.0022		9	9	Ð	9	9	9	2	2	9
Trichlorofluoromethane (s)	EPA 8010	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chioride (f)	EPA 8010	6/60	0,0027		9	ş	9	2	9	2	2	9	9
Vinyi Chloride (s)	EPA 8010	6/6n	0,0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NBC	NEG

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DATACHEN MALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

			001+00+100	F. 10.14	***	#C.0	
Parameter	Method	Units		Site :	53-0A E16HT	ELGHT	
Purgeable Halocarbons (cont)	EPA 8010	6/6n	MDL				
trans-1,3-Dichloropropene (f)	EPA 8010	6/6n	0.0048		2	QN	
trans-1,3-Dichloropropene (s)	EPA 8010	6/6n	0.0048		NEG	NEG	
Methylene Chloride (†)	EPA 8010	6/6n	0,0017		2	0,0049	
Methylene Chloride (s)	EPA 8010	6/6n	0.0017		NEG	NEG	
1,1,2,2-Tetrachioroethane (f)	EPA 8010	6/Bn	0,0019		2	9	
1,1,2,2-Tetrachloroethane (s)	EPA 8010	6/6n	0.0019		NEG	NEG	
Tetrachloroethene (f)	EPA 8010	6/6n	0,0019		9	2	
Tetrachloroethene (s)	EPA 8010	6/6n	0,0019		NEG	NEG	
1,1,1-Trichloroethane (f)	EPA 8010	6/6n	0,0026		2	Q	
1,1,1-Trichloroethane (s)	EPA 8010	6/6n	0,0026		NEG	NEG	
1,1,2-Trichloroethane (f)	EPA 8010	6/6n	0,0026		2	Q	
1,1,2-Trichloroethane (s)	EPA 8010	6/6n	970000		NEG	NEG	
Trichloroethene (TCE) (f)	EPA 8010	6/6n	0,0030		2	2	
Trichloroethene (TCE) (s)	EPA 8010	6/6n	0.0030		NEG	NEG	
Trichlorofluoromethane (f)	EPA 8010	6/6n	0,0022		9	Q	
Trichlorofluoromethane (s)	EPA 8:510	6/6n	0.0022		NEG	NEG	
Vinyl Chloride (f)	EPA 8010	6/6n	0,0027		2	Ð	
Viny! Chloride (s)	EPA 8010	6/6n	0,0027		NEG	NEG	

^{*} Revised 07/10/87

DATACHEM AMALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

					81-A	B1-A	81-A	GW1-A	9 1 -B	GW1-E			B2-B
			Detection	Field #:	0-1.5	2.5-4	5-6.5	10-11.5	5-6.5	20-21.5	SS-1A	SS-1B	0-1.5
Parameter	Me thod	Un i ts	Limit	Site :	ONE	ONE	ONE	ONE	ONE	ONE	ONE	SNE E	OML
Purgeable Arometics	EPA 8020	6/6n	Ā										
Benzene (†)	EPA 8020	6/6n	0,0013		9	9	9	9	9	9	0,0071	Ð	2
Benzene (s)	EPA 8020	6/6n	0,0013		NEG	NEG	NEG	NEG	NEG	NEG	& S	NEG	NEG
Chi orobenzene (f)	EPA 8020	6/bn	0,0018		9	9	ð	9	2	2	2	9	9
Chlorobenzene (s)	EPA 8020	6/6n	0,0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	6/Bn	0,0023		9	9	9	2	g	9	2	9	9
1,2-Dichlorobenzene (s)	EPA 8020	6/6n	0,0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	6/6n	0.0046		9	9	9	2	2	9	9	9	9
1,3-Dichlorobenzene (s)	EPA 8020	6/6n	0,0046		NEG	NEG	NEG	NEG	NEG NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	6/6n	0.0022		9	9	Q	2	9	9	2	9	9
1,4-Dichlorobenzene (s)	EPA 8020	6/6n	0,0022		NEG	NEG	NEG	NEG	N BC	NEG	S E	N EG	NEG
Ethyl benzene (†)	EPA 8020	6/bn	0,0038		9	9	0.043	2	9	9	0.0071	9	9
Ethylbenzene (s)	EPA 8020	6/6n	0,0038		NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	6/bn	0.0032		9	9	0.094	9	9	9	0,10	0.1	Ð
Toluene (s)	EPA 8020	6/6n	0,0032		NEG	NEG	POS	NEG	NEG	NEG	Pos	8	NEG
Xylenes (f)	EPA 8020	6/bn	0,0061		9	9	0.043	2	2	£	9	2	Q
Xylenes (s)	EPA 8020	6/6n	0,0061		NEG	NEG	POS	N EG	NEG	NEG	NEG	N EG	NEG

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			Detection	Field #:	82-8 2.5-4	82-8 5-6.5	B2-C 0-1.5	82-C 2.5-4	82-c 5-6.5	GW2-A 5-6.5	G#2-8 5-6.5	GW2-C 15-16.5	GW2-D 15-16.5
Parameter	Method	Un I ts	Limit	Site :	OMI	TWO	OML	OMI	OML	OML	OML	OML	TWO
Purgeable Arcmetics (cont.)	EPA 8020	6/6n	MO.										
Benzene (†)	EPA 8020	6/6n	0,0013		9	9	0.014	9	9	9	2	2	9
Benzene (s)	EPA 8020	6/6n	0,0013		NEG	NEG	POS	NEG	NEG NEG	NEG	NEG	NEG	NEG
Chlorobenzene (†)	EPA 8020	6/bn	0.0018		₽	Ş	9	9	2	9	9	2	9
Chlorobenzene (s)	EPA 8020	6/60	0,0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	6/6n	0,0023		9	2	9	2	2	9	2	2	9
1,2-Dichlorobenzene (s)	EPA 8020	6/6n	0,0023		NEG	NEG	NEG S	NEG	SB 80	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (+)	EPA 8020	6/6n	0.0046		2	9	2	9	9	2	9	9	9
1,3-Dichlorobenzene (s)	EPA 8020	6/60	0,0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NBC	NEG
1,4-Dichlorobenzene (f)	EPA 8020	6/6n	0,0022		9	2	9	9	9	9	2	9	9
1,4-Dichlorobenzene (s)	EPA 8020	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG NEG	NEG	NEG	N BG	NEG
Ethylbenzene (f)	EPA 8020	6/60	0,0038		9	£	0.35	2	0.011	2	2	2	9
Ethylbenzene (s)	EPA 8020	6/6n	0,0038		NEG	NEG	POS	NEG	POS	NEG	NEG	SB N	NEG
Toluene (f)	EPA 8020	6/6n	0,0032		9	2	0.54	9	0,0088	9	9	2	2
Toluene (s)	EPA 8020	6/6n	0,0032		NEG	NEG	P0S	NEG	POS	NEG	NEG	NEG	NEG
Xylenes (†)	EPA 8020	6/60	0,0061		9	Q	9.	9	0.076	9	9	9	9
Xylenes (s)	EPA 8020	6/6n	0,0061		NEG	NEG	POS	NEG	POS	NEG	NEG	NEG	NEG

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Second Column Confirmations

Parameter	Method	stin.	Detection	Field#: 15	GW2-E 15-16.5 TWO	55-2A TWO	55-2B TWO	SS-2C	83-A 0-1.5 THREE	83-A 2,5-4 THREE	83-A 5-6.5 THREE	83-8 0-1.5 THREE	83-8 2.5-4 THREE
Purgable Archatics (cont.) Benzane (†)	EPA 8020 EPA 8020	6/6n	MD. 0,0013		NEG N	G PO	NEG N	NEG NO	G SS	NEG NEG	O S	9 99 99	N N N N N N N N N N N N N N N N N N N
Benzene (s) Chiorobenzene (f) Chiorobenzene (s)	EPA 8020 EPA 8020	6/6n 6/6n	0,0018		O SA	N. N.E.G	S S	NEG N	ON NEG	NEG NO	NEG N	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	S S S
1,2-01ch1orobenzene (†)	EPA 8020 EPA 8020	6/6n 6/6n	0,0023		ND NEG	N NEG	NEG NO	NEG NO	N EG	NEG NEG	2 9 9	2 9 S	5 Å 8
1,3-Dichiorobenzene (f)	EPA 8020 EPA 8020	6/6n 6/6n	0.0046		NEG NEG	N S	S S S	A S	NEG NO	N EG	2 9 1	2 H 4	NEG C
1,4-01chlorobenzene (f)	EPA 8020 EPA 8020	6/6n 6/6n	0,0022		NEG PO	NEG NEG	NEG B	NEG NO	2 98	9 99 9 99	9 g	2 88 8 8	NEG (
Ethyl benzene (f)	EPA 8020 EPA 8020	6/6n	0,0038		NEG	NEG PO	Q SB N	9 S	0.16 NEG	NEG NE	N 8	S S	NE G
Toluene (f) Toluene (s)	EPA 8020 EPA 8020	6/6n 6/6n	0,0032		EG G	N EG	0.018 POS	NEG NEG	0.018 POS	N N C	NEG NEG	2 29 9	9 9 9 9 9
Xylenes (†) Xylenes (s)	EPA 8020 EPA 8020	6/6n	0.0061		NEG NE	NEG NEG	N EG	9 99 9 99	0.057 POS	0.75 POS	Pos	N RBC	NEG S

DATACHBA AWALYTICAL REPORT
Duluth IAP - Soll Samples
Second Column Confirmations

					B3-8	83-C	83-C	83-C	83-c	GW3-A	G#3-B	GH3-0	
			Detection	Field #:	5-6.5	0-1.5	2.5-4	5-6.5	5-6.5	5-6.5	5-6.5	5-6.5	SS-3A
Parameter	Me thod	Un I ts	Limit	Site :	THREE	THREE							
Purgeable Arometics (cont.)	EPA 8020	6/6n	MD										
Benzene (†)	EPA 8020	6/6n	0,0013		9	9	윷	9	₽	ð	9	9	9
Benzene (s)	EPA 8020	6/6n	0,0013		NEG	N EG	NEG						
Chlorobenzene (f)	EPA 8020	6/6n	0,0018		9	9	9	9	9	9	9	9	Ş
Chlorobenzene (s)	EPA 8020	6/6n	0,0018		NEG	N 99 99	NEG						
1,2-Dichlorobenzene (f)	EPA 8020	6/6n	0,0023		9	9	9	9	2	9	9	9	9
1,2-Dichlorobenzene (s)	EPA 8020	6/6n	0,0023		NEG	99 99 89	NEG						
1,3-Dichlorobenzene (+)	EPA 8020	6/6n	0,0046		2	2	2	9	2	2	9	9	9
1,3-Dichlorobenzene (s)	EPA 8020	6/6n	0,0046		NEG	N EG	NEG						
1,4-Dichlorobenzene (+)	EPA 8020	6/60	0,0022		9	9	₽	9	9	9	9	9	9
1,4-Dichlorobenzene (s)	EPA 8020	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	N EG	NEG	N EG	NEG
Ethyl benzene (f)	EPA 8020	6/6n	0.0038		9	9	9	9	£	9	9	9	2
Ethylbenzene (s)	EPA 8020	6/6n	0,0038		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
Toluene (f)	EPA 8020	6/ 6 n	0,0032		9	9	9	9	9	2	9	9	0.014
Toluene (s)	EPA 8020	6/6n	0,0032		NEG	NEG	NEG	NEG	N EG	NEG	NEG	N EG	Pos
Xylenes (f)	EPA 8020	6/6n	0,0061		2	9	9	9	9	2	9	2	2
Xylenes (s)	EPA 8020	6/6n	0,0061		NEG	93 28 28	NEG						

DAINCHEN MALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

Paremeter	Me thod	un I ts	Detection Limit	Fleid#: Site	SS-38 THREE	SS-3C THREE	84-C 2.5-4 FOUR	5-6-5 FOUR	7.5-9 FOUR	84-0 2.5-4 FOUR	84-0 5-6-5 FOUR	84-D 7.5-9 FOUR	84-E 2,5-4 FOUR
Purgsable Archatics (cont.) Benzene (+)	EPA 8020 EPA 8020	6/6n	Ma. 0,0013		6 6	S S	Q 99 NEG	N N N N N N N N N N N N N N N N N N N	N P P P P P P P P P P P P P P P P P P P	NEG NO	ð ä	2 9	NEG NEG
Benzene (s) Chi orobenzene (f) Chi orobenzene (s)	EPA 8020 EPA 8020	5/6n 5/6n	0.0018		NEG NEG	NEG NEG	NEG NG	NEG NO	ð ä	NEG NO	NEG N	Q SS	NEG NEG
1,2-Dichlorobenzene (f)	EPA 8020 EPA 8020	6/6n 6/6n	0,0023		NEG NEG	NEG NEG	NEG NEG	NEG	NEG S	NEG NEG	2 g	3 8	S S S
1,3-Dichlorobenzene (f)	EPA 8020 EPA 8020	6/6n 6/6n	0,0046		NEG NEG	N EG	NEG NEG	N S	2 8 2 8 2 8	A 25 25 25 25 25 25 25 25 25 25 25 25 25 2	2 9 (9 8g 9	2 9 S
1,4-Dichlorobenzene (f)	EPA 8020 EPA 8020	6/6n 6/6n	0,0022		NEG NEG	NEG TO	NEG N	9 99	<u> </u>	S S	2 8		NEG 2
Ethylbenzene (f) Ethylbenzene (s)	EPA 8020 EPA 8020	6/6n 6/6n	0,0038		N NO NEG	NEG NEG	NEG NEG	NEG NE	NEG 45	9 99 NEC P	NEG P	2 9	NEG 5
Toluene (†) Toluene (s)	EPA 8020 EPA 8020	6/6n 6/6n	0.0032		S S	ND NEG	NEG	N NEG	NEG	N SO	2 8	2	2 9
Xylenes (f) Xylenes (s)	EPA 8020 EPA 8020	6/6n 6/6n	0,0061		NEG A	NEG NEG	ND NEG	NEG NEG	2 8	N S	2	2 80 2 80 2 80	S S

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MADE indicates that the parameter was not detected.

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Duluth IAP - Soil Samples Second Column Confirmations

					84-E	GW4-A	GW4-B	GW4-C	GW4-D	84-A	B4A	B4-A	B4-B
			Detection	Field #:	5-6.5	10-11,5	5-6.5	10-12	5-6-5	2.54	7.6.5	7.5-9	2.5-4
Parameter	Me thod	Un i ts	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgable Arceatics (cont.)	EPA 8020	6/6n	K										
Benzene (†)	EPA 8020	5/6n	0,0013		9	9	9	9	9	9	9	9	1.6
Benzene (s)	EPA 8020	6/6n	0,0013		NEG	NEG	NEG	NEG	N BC	NEG	NEG	NEG	Pos
Chiorobenzene (f)	EPA 8020	5/bn	0,0018		9	2	9	9	9	Ð	9	2	2
Chlorobenzene (s)	EPA 8020	6/6n	0,0018		NEG	N 66	NEG	NEG	N BG	N EG	NEG	N EG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	6/6n	0,0023		9	9	9	9	9	9	2	2	2
1,2-Dichlorobenzene (s)	EPA 8020	6/6n	0,0023		N BG	NEG	NEG	NEG	NEG	NEG C	NEG	N BG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	6/6n	0.0046		9	2	9	2	9	9	9	2	9
1, 3-Dichlarobenzene (s)	EPA 8020	6/6n	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichtorobenzene (f)	EPA 8020	6/6n	0.0022		9	9	ð	9	9	9	9	9	9
1,4-Dichlorobenzene (s)	EPA 8020	6/6n	0,0022		NEG	NEG	NEG	NEG	N EG	NEG	NEG	S EG	NEG
Ethylbenzene (f)	EPA 8020	6/bn	0,0038		9	2	9	9	2	9	2	2	3,2
Ethylbenzene (s)	EPA 8020	6/6n	0,0038		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
Tolumbre (†)	EPA 8020	6/bn	0,0032		9	9	2	9	9	9	9	6600*0	6.4
Tolumne (s)	EPA 8020	6/6n	0,0032		NEG	NEG	NEG	NEG	NEG	NBC SBN	NEG	POS	PO S
Xylenes (f)	EPA 8020 ·	6/6n	0,0061		9	ð	9	9	9	9	2	0.21	82.
Xyienes (s)	EPA 8020	6/6n	0,0061		NEG	NEG SEC	NEG	NEG	Sec	NEG	NEG	SS S	POS

DATACHER ANALYTICAL REPORT
Duluth 1AP - Soll Samples
Second Column Confirmations

					84-8	8- 2 9					GW5-A	G#5#9
			Detect ion	Field #:	5-6.5	7,5-11.5	SS-4A	SS-4B	SS-4C	SS-40	5-6.5	9,5-11
Parameter	Method	Units	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FIVE	FIVE
Purgeable Archetics (cont.)	EPA 8020	6/6n	덫									
Benzene (†)	EPA 8020	6/6n	0,0013		9	9	9	6.8	9	0.86	9	2
Benzene (s)	EPA 8020	6/6n	0,0013		NEG	NEG	NES:	P0S	NEG	POS	NEG	NEG
Chiorobenzene (f)	EPA 8020	6/6n	0,0018		9	ð	5	2	₹	2	2	2
Chiorobenzene (s)	EPA 8020	6/6n	0,0018		NEG	NEG	NEG	SES.	SBN	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	5/6n	0,0023		9	9	Ş	Ş	9	2	9	2
1,2-Dichtorobenzene (s)	EPA 8020	6/60	0,0023		NEG	NEG	N 88	NEG	NBC	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	6/6n	0,0046		9	9	9	Ş	5	5	2	2
1,3-Dichlorobenzene (s)	EPA 8020	5/5n	0,0046		NEG	NEG	N 88	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (+)	EPA 8020	6/6n	0,0022		9	9	ş	9	9	9	2	2
1,4-Dichlorobenzene (s)	EPA 8020	6/6n	0,0022		NEG	NEG	SB 88	NEG	N EG	NEG	N EG	NEG
Ethyl benzene (f)	EPA 8020	6/6n	0,0038		9	g	9	170	2	2	2	£
Ethylbenzene (s)	EPA 8020	6/6n	0.0038		NEG	NEG	NEG	P.05	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	6/6n	0,0032		3.5	0.011	2	21.	2.4	3,5	9	0,0075
Tolugne (s)	EPA 8020	6/6n	0,0032		P0S	P.05	NEG NEG	POS	Pos	Pos	NEG	POS
Xylenes (f)	EPA 8020	6/6n	0,0061		30.	0,087	2	15.	4.9	<u>:</u>	9	9
Xylenes (s)	EPA 8020	6/6n	0,0061		POS	P.05	NEG	POS	POS	Pos	NEG	NEG

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DATACHER ANALYT ICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

			:		GW5-C		6	((6	i 6	₩-98-¥	V-98-7	86-8 6-36
Parameter	Me thod	Un its	Defection Limit	Site :	FIVE	SS-SA FIVE	SS-38 FIVE	SS-3C FIVE	53-50 F1VE	SS-3E FIVE	SIX	SIX	SIX
Purgeable Arcmatics (cont.)	EPA 8020	6/6n	ď										
Benzene (†)	EPA 8020	6/6n	0,0013		9	9	9	Ð	9	9	9	9	9
Benzene (s)	EPA 8020	6/6n	0,0013		NEG	NEG	NEG	NEG	NEG	SEN	NEG	NEG	NEG
Chlorobenzene (†)	EPA 8020	b/bn	0.0018		9	9	9	9	2	9	9	2	9
Chiorobenzene (s)	EPA 8020	6/6n	0,0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichi orobenzene (+)	EPA 8020	6/bn	0,0023		2	9	9	9	2	9	2	2	9
1,2-Dichlorobenzene (s)	EPA 8020	6/6n	0,0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
1,3-Dichlorobenzene (+)	EPA 8020	6/bn	0.0046		9	9	9	2	9	운	2	2	g
1,3-Dichlorobenzene (s)	EPA 8020	6/6n	0,0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichiorobenzene (+)	EPA 8020	b/bn	0,0022		9	9	9	9	9	9	9	9	9
1,4-Dichlorobenzene (s)	EPA 8020	6/6n	0,0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (+)	EPA 8020	6/bn	0,0038		9	2	9	0.045	0,012	0,031	2	9	9
Ethylbenzene (s)	EPA 8020	6/60	0,0038		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
Toluene (f)	EPA 8020	6/bn	0,0032		9	0.012	9	9	9	2	2	Ð	9
Toluene (s)	EPA 8020	6/60	0,0032		NEG	NEG	NEG	NEG	NEG SEC	NEG	NEG	N EG	NEG
Xylenes (f)	EPA 8020	b/bn	0,0061		9	0.063	9	9	2	0.025	9	2	2
Xylenes (s)	EPA 8020	6/6n	0,0061		NEG	NEG	NEG	NEG	NEG	NEG	NEG	93 N	NEG

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

					B-98	87-A	B7 -A	87-8	87-8	GW7-A	GW7-B	GW7-C	CC_7A*
	:		Defection	Field #:	2.54 SIX	0-1.5 SEVEN	2.54 SEVEN	0-1.5 SEVEN	2.5-4 SEVEN	SEVEN	SEVEN	SEVEN	SEVEN
Parameter	Method	21.15	- E -1	-									
Purgeable Aromatics (cont.)	EPA 8020	6/6n	MDL						!	Ş	4	Ş	Ş
Benzene (†) Benzene (s)	EPA 8020 EPA 8020	6/6n 6/6n	0,0013		NEG N	NEG NEG	N EG	NEG NEG	Z Z EG Z	2	NEG S	NEG C	NEG
Chlorobenzene (f) Chlorobenzene (s)	EPA 8020 EPA 8020	5/6n 6/6n	0,0018		N EG	N EG	NEG NEG	ND NEG	NEG P	NEG NEG	N EG	O SE	NEG NEG
1,2-Dichlorobenzene (f)	EPA 8020 EPA 8020	6/6n 6/6n	0.0023		ND NEG	NEG NO	NEG NEG	ND NEG	ND NEG	SE &	NEG	NEG NEG	ND NEG
1,3-Dichiorobenzene (f)	EPA 8020 EPA 8020	6/6n 6/6n	0.0046		NEG N	NO NEG	N NEG	ND NEG	NO NEG	S S	NEG NEG	NO NEG	NEG NEG
1,4-Dichlorobenzene (f)	EPA 8020 EPA 8020	6/6n 6/6n	0.0022		NEG NEG	NEG NEG	NEG KO	NO NEG	NEG NEG	S S	N NO	NEG NEG	NEG NEG
Ethyl benzene (f)	EPA 8020 EPA 8020	6/6n 6/6n	0.0038		ND NEG	ND NEG	N PEG	N N N	N NEG	NEG NO	ND NEG	NEG NEG	NEG NEG
Toluene (†) Toluene (s)	EPA 8020 EPA 8020	6/6n 6/6n	0,0032		ND NEG	ND NEG	ND NEG	ND NEG	ND	N NEG	N SS	NEG NE	NEG NEG
Xylenes (†) Xylenes (s)	EPA 8020 EPA 8020	6/6n 6/6n	0.0061		NEG	ND NEG	ND NEG	NEG NEG	NEG NEG	N NEG	NEG N	NEG P	NEG NEG

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT Dujuth IAP - Soil Samples Second Column Confirmations

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					B8-A	B8~A	B8 -¥	97 88	Ф 88	99 88	G#8-A	948	O-8#8
Parameter	Me thod	Un I†s	Detection	Field #: Site :	0-1.5 EIGHT	2,5-4 E10HT	5-6.5 EIGHT	0-1.5 EIGHT	2.5-4 EIGHT	5-6.5 EI GHT	5-6.5 E1GHT	10-11.5 EIGHT	10-11.5 EIGHT
Purgeable Aromatics (cont.)	EPA 8020	6/6n	MD										
Benzene (†)	EPA 8020	g/gu	0.0013		Ð	9	2	9	9	9	9	9	9
Benzene (s)	EPA 8020	6/6n	0,0013		NEG	98 98 98	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (†)	EPA 8020	6/6n	0,0018		9	2	9	9	9	2	2	2	9
Chlorobenzene (s)	EPA 8020	6/6n	0,0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	6/6n	0,0023		9	9	2	9	2	9	9	2	9
1,2-Dichlorobenzene (s)	EPA 8020	6/6n	0,0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	6/bn	0.0046		9	9	9	9	2	9	2	2	9
1,3-Dichlorobenzene (s)	EPA 8020	6/6n	0,0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	6/6n	0.0022		9	9	2	ᄝ	2	2	9	2	2
1,4-Dichlorobenzene (s)	EPA 8020	6/6n	0,0022		NEG NEG	NEG	N EG	NEG	NEG	NEG	N EG	NEG	NEG
Ethyl benzene (f)	EPA 8020	6/6n	0.0038		9	9	9	9	9	2	9	2	9
Ethylbenzene (s)	EPA 8020	6/6n	0,0038		NEG	N EG	NEG	NEG NEG	NEG	NEG	NEG	88 88	NEG
Toluene (f)	EPA 8020	6/6n	0.0032		9	9	9	9	2	Ð	9	2	9
Toluene (s)	EPA 8020	6/6n	0,0032		NEG	NEG	98 N	SE SE SE SE SE SE SE SE SE SE SE SE SE S	NEG	NEG	NEG	NEG	NEG
Xylenes (f)	EPA 8020	b/bn	0,0061		9	Ş	2	9	9	9	2	Ş	9
Xylenes (s)	EPA 8020	6/6n	0,0061		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

DATACHEN ANALYTICAL REPORT
Dututh IAP - Soil Samples
Second Column Confirmations

			Detect Ion	Field #:	\$5-8A*	SS-8B*	
Por ameter	Method	Units	Limit	Site :	EI GH	EIGHT	
Purceable Arcestics (cont.)	EPA 8020	6/6n	MDL				
	000	0/011	0,0013		2	QN	
Benzene (f) Benzene (s)	EPA 8020	6/6n	0,0013		NEG	NEG	
	0000	0,01	0.0018		2	9	
Chlorobenzene (†) Chlorobenzene (s)	EPA 8020	6/6n	0.0018		NEG	NEG	
	0000	9,01	0.0023		2	æ	
1,2-Dichlorobenzene (†) 1,2-Dichlorobenzene (s)	EPA 8020	6/6n	0,0023		NEG	NEG	
	000	970	0 0046		2	g	
1,3-Dichlorobenzene (f) 1,3-Dichlorobenzene (s)	EPA 8020 EPA 8020	5/5n	0,0046		NEG	NEG	
	0000	0/01	0.0022		2	2	
1,4-Dichlorobenzene (f)	EPA 8020	5/6n	0,0022		NEG	NEG	
	0000	0/0::	92.00		2	QN	
Ethylbenzene (†) Ethylbenzene (s)	EPA 8020	5/6n	0,0038		NEG	NEG	
	0000	10/0	0.0032		2	9.4	
Toluene (†) Toluene (s)	EPA 8020	6/6n	0.0032		NEG	Pos	
	FPA 8020	6/60	0,0061		9	SN.	
Xylenes (1) Xylenes (5)	EPA 8020	6/6n	0,0061		NEG	NEC	

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

					B1-A	B1-A	B1-A	GW1-A	€ 1-8	₹ 3-1-E		
			Detection	Field #:	0-1-5	2-5.4	5-6.5	10-11.5	5-6.5	20-21.5	SS-1A	85-18
Parameter	Method	Un its	Limit	Site :	ONE	ONE	ONE	ONE	ONE	ONE	ONE	ONE
Pesticides	EPA 3550/8080	6/6n	NO.									
Aldrin (†)	EPA 3550/8080	6/6n	0,002		9	욮	9	9	2	2	2	9
Aldrin (s)	EPA 3550/8080	6/6n	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
a lpha-BHC (†)	EPA 3550/8080	6/6n	0,0008		2	Ş	2	2	9	9	2	9
alpha-BHC (s)	EPA 3550/8080	6/6n	0,0008		NEG	NEG	NEG	NEG	NEG	№ EG	N EG	NEG
beta-BHC (f)	EPA 3550/8080	6/bn	0,0002		9	9	2	9	2	9	2	9
beta-BHC (s)	EPA 3550/8080	6/6n	0,0002		NEG	NEG	NEG	98 N	98 88	NEG	SB REC	NEG
delta-BHC (f)	EPA 3550/8080	6/6n	9000*0		2	9	9	2	2	2	2	9
delta-BHC (s)	EPA 3550/8080	6∕6n	900000		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 3550/8080	6/6n	0,003		9	9	9	9	2	9	2	9
Lindane (s)	EPA 3550/8080	6/6n	0,003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chi ordane (†)	EPA 3550/8080	6/ 6n	0.05		9	9	2	2	g	9	2	9
Chiordane (s)	EPA 3550/3080	6/6n	0.05		NEG	NEG	NEG	N 86	NEG	NEG	98	NEG
4,41-000 (†)	EPA 3550/8080	6/ 6 n	0.0004		9	0.02	0,002	9	9	ð	2	9
4,4'-000 (s)	EPA 3550/8080	6/6n	0.0004		NEG	Pos	NEG	NEG	8 8 8 8	NEG	SEG NEG	NEG
4,4*-50€ (+)	EPA 3550/8080	6/6n .	0.007		9	0.02	2	9	9	9	9	2
4,4'-00E (s)	EPA 3550/8080	6/6n	0.007		NEG	Pos	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DOT (†)	EPA 3550/8080	6/6n	0.004		9	0,02	9	9	9	9	9	9
4,4'-ODT (s)	EPA 3550/8080	6/6n	0.004		NEG	Pos	NEG	NEG	N S S S	NEG	99 N	NEG

DATACHEM AMALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

Parameter Pesticides (cont.) Aidrin (f) Aidrin (s) aipha-BHC (f) aipha-BHC (f) beta-BHC (f) delta-BHC (f)	Me thod EPA 3550/8080 EPA 3550/8080 EPA 3550/8080 EPA 3550/8080 EPA 3550/8080 EPA 3550/8080	ug/g ug/g ug/g ug/g ug/g ug/g	Detection Limit M.D. 0,002 0,002 0,0008 0,0008 0,0002 0,0002	Si to di si	B3-A O-1.5 THREE NG	B3-A 2,5,4 THREE THREE NG	B3-A 5-6.5 THREE ND NG	B3-8 0-1.5 THREE THREE NG NG NG NG NG NG NG NG NG	NEG	NEG	ND NES	ND NES	
Lindane (f) Lindane (s) Chlordane (f)	EPA 3550/8080 EPA 3550/8080 EPA 3550/8080	6/6n 6/6n 6/6n 6/6n	0,003 0,003 0,05 0,05		NEG NEG	NEG ND NEG	NEG ND NEG	NEG NEG	NEG NEG	NEG NEG	NEG NEG	A 0 8 8	
4,4*-500 (f)	EPA 3550/8080	6/6n 6/6n	0,0004		2	0.09 NEG	8 8 8 8	0.41 POS	2.1 P0S ND	0.004 NEG	5 8 5 E	5 g	
4,4'-00E (4) 4,4'-00E (s) 4,4'-00T (†)	EPA 3550/8080 EPA 3550/8080 EPA 3550/8080 EPA 3550/8080	6/6n 6/6n 6/6n 6/6n	0,007		NEG 0.01 POS	N G SBN	NEG 0.008	NEG 0.08 POS	N KD	NEG NEG	NEG 0,10 POS	NEG 0.09 POS	

н-180

"MD" indicates that the parameter was not detected.

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DATACHEM ANALYTICAL REPORT Duluth IAP - Soll Samples Second Column Confirmations

					BC-3	GW3-A	GW3-B	GW3-D			
			Detection	Field #:	5-6.5	5-6.5	5-6.5	5-6.5	SS-3A	SS-38	SS-3C
Par amater	Method	Units	Limit	Site :	THREE	THREE	THREE	THREE	THREE	THREE	THREE
Pesticides (cont.)	EPA 3550/8080	6/6n	N								
Aidrin (f)	EPA 3550/8080	6/6n	0,002		9	9	9	9	2	2	9
Aidrin (s)	EPA 3550/8080	6/6n	0,002		NEG	NEG	NEG	NEG	NEG	NEG	NEG
alpha-BHC (+)	EPA 3550/8080	6/ 6n	900000		9	윷	2	9	2	9	9
alpha-BHC (s)	EPA 3550/8080	6/6n	0,0008		NEG	NEG	NEG	NEG	NEG	NEG	NEG
beta-BHC (f)	EPA 3550/8080	6/bn	0,0002		9	0,02	9	9	9	2	9
beta-BHC (s)	EPA 3550/8080	6/6n	0,0002		NEG	NEG	NEG	NEG	NEG	NEG	NEG
delta-BHC (f)	EPA 3550/8080	6/6n	900000		9	0.002	9	9	9	5	9
delta-BMC (s)	EPA 3550/8080	6/6n	900000		NEG	Pos	N 66	NEG	NEG	NEG	NEG
Lindane (f)	EPA 3550/8080	6/ 6 n	0.003		2	9	9	2	2	9	9
Lindane (s)	EPA 3550/8080	6/6n	0,003		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (†)	EA 3550/8080	6/6n	0.05		9	2	9	9	9	9	2
Chlordane (s)	EPA 3550/8080	6/6n	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4*-500 (†)	EPA 3550/8080	6/6n	0,0004		0,003	2	Q	9	2	9	9
4,4'-DOD (s)	EPA 3550/8080	6/6n	0,0004		Pos	NEG	NEG	N EG	NEG	NEG	NEG
4,4'-00€ (†)	EPA 3550/8080	6/bn	0,007		9	0.02	2	9	2	2	9
4,4'-DDE (s)	EPA 3550/8080	6/6n	0,007		NEG	Pos	NEG	NEG	NEG	NEG	NEG
4,4'-DOT (f)	EPA 3550/8080	6/6n	0.004		90*0	0.04	9	0,007	2	9	9
4,4'-DOT (s)	EPA 3550/8080	6/6n	0.004		POS	POS	NEG N	POS	NEG	NEG NEG	NEG

DATACHER ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

					GW5-A	GW5-B	GW5-C					
Parameter	Met had	Units	Detection Limit	Field #: Site :	5-6.5 FIVE	9.5-11 FIVE	10-11.5 F1VE	SS-5A F I VE	SS-5B F I VE	SS-5C FIVE	SS-50 F I VE	SS-5E FIVE
Pesticides (cont.)	EPA 3550/8080	6/6n	MOL									
Aldrin (†)	EPA 3550/8080	6/60	0,002		2	9	9	2	9	2	2	9
Aldrin (s)	EPA 3550/8080	6/6n	0,002		NEG	NEG	NEG	NEG	N EG	N BG	NEG	NEG
alpha-BHC (†)	EPA 3550/8080	6/6n	0,0008		2	9	9	2	2	2	2	2
alpha-BHC (s)	EPA 3550/8080	6/6n	900000		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
beta-BHC (f)	EPA 3550/8080	6/6n	0.0002		2	9	9	9	90.0	2	Q	9
beta-BHC (s)	EPA 3550/8080	6/6n	0,0002		NEG	NEG	NEG	NEG	NEG	NEG	SBN 986	NEG
delta-BHC (f)	EPA 3550/8080	6/6n	9000*0		0.02	2	9	9	9	2	9	2
delta-BHC (s)	EPA 3550/8080	6/6n	9000*0		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 3550/8080	6/bn	0,003		9	9	9	S	9	2	9	ą
Lindane (s)	EPA 3550/8080	6/6n	0,003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 3550/8080	6/6n	0.05		9	2	9	9	9	2	9	2
Chlordane (s)	EPA 3550/8080	6/6n	90.0		NEG	NEG	NEG	NEG	N EG	NEG	NEG	NEG
4,41~000 (†)	EPA 3550/8080	6/6n	0.0004		2	2	2	2	Q	2	9	2
4,4'-DOD (s)	EPA 3550/8080	6/6n	0,0004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,41-DDE (f)	EPA 3550/8080	6/6n	0,007		2	2	9	9	9	Ş	2	Ð
4,4'-00E (s)	EPA 3550/8080	6/6n	0.007		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-00T (f)	EPA 3550/8080	6/6n	0.004		æ	0.07	9	9	9	*9	0.004*	0.07*
4,4'-DOT (s)	EPA 3550/8080	6/6n	0.004		NEG	POS	NEG	NEG	NEG	NEG*	POS	FOS*

^{*} Rev Ised 07/10/87

DATACHEM MARLYTICAL REPORT

Duluth IAP - Soil Samples
Second Column Confirmations

: : : :

					B7-A	87-A	87-8	87-B	GW7-A	GW7 -B	GW7 -C	
			Detection	Field #:	0-1.5	2.5-4	0-1.5	2,5-4	10-11.5	10-11,5	15-16.5	SS-7A*
Parameter	Me thod	Un its	Limit	Site :	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN
Pesticides (cont.)	EPA 3550/8080	6/6n	MDL									
Aldrin (f)	EPA 3550/8080	6/6n	0,002		2	9	9	9	9	9	9	2
Aidrin (s)	EPA 3550/8080	6/6n	0.002		NEG	NEG	NEG	NEG	NEG	NEG	N BC	NEG
alpha-BHC (f)	EPA 3550/8080	6/6n	0,0008		2	9	⊋	9	9	9	9	9
alpha-BHC (s)	EPA 3550/8080	6/6n	0.0008		NEG	NEG	NEG	NEG	N BG	NEG	NEG	NEG
beta-BHC (f)	EPA 3550/8080	6/6n	0,0002		2	9	9	9	2	9	9	9
beta-BHC (s)	EPA 3550/8080	6/6n	0,0002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
deita-BHC (f)	EPA 3550/8080	6/6n	9000*0		9	9	9	9	9	2	Q	9
delta-BHC (s)	EPA 3550/8080	6/6n	900000		NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 3550/8080	6/6n	0.003		2	9	9	9	9	2	2	9
Lindane (s)	EPA 3550/8080	6/6n	0,003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 3550/8080	6/bn	0.05		2	2	2	9	9	2	2	2
Chlordane (s)	EPA 3550/8080	6/6n	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4*-000 (f)	EPA 3550/8080	6/bn	0.0004		3	9	2	ᄝ	g	Ð	9	9
4,4'-DDO (s)	EPA 3550/8080	6/6n	0.0004		NEG	NEG	NEG	NEG	NEG	NEG	NEG NEG	NEG
4,4'-00E (f)	EPA 3550/8080	6/6n	0,007		2	9	2	2	9	9	9	9
4,4'-00E (s)	EPA 3550/8080	6/6n	0.007		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-00T (+)	EPA 3550/8080	6/61	0.004		9	9	9	9	9	2	9	9
4,4'-DOT (s)	EPA 3550/8080	6/60	0.004		NEG	NEG	NEG	NEG	NEG S	NEG	NEG	NEG

^{*} Revised 07/10/87

DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

					B8-A	B8A	B8~A	₽- 88	₽ 88	ዋ 88	GW8-A	G-89-B	GM8-C
			Detection	Field #:	0-1.5	2.5-4	5-6.5	0-1-5	2,5-4	5-6.5	5-6.5	10-11.5	10-11.5
Parameter	Me thod	th its	Limit	Site :	EIGHT	EIGHT	EIGHT	EGH	EIGHT	EIGHT	EIGHT	EIGHT	EIGHT
Pesticides (cont.)	EPA 3550/8080	6/6n	Ŭ¥										
Aldrin (f)	EPA 3550/8080	6/6n	0,002		2	9	æ	9	9	9	9	9	9
Aidrin (s)	EPA 3550/8080	6/6n	0,002		N EG	N EG	NEG	NEG	NEG	N EG	NBG S	NEG	NEG
alpha-GHC (f)	EPA 3550/8080	6/60	900000		2	Ş	9	9	2	9	2	2	Ð
alpha-8HC (s)	EPA 3550/8080	6/6n	0,0008		NEG	NEG	NEG	NEG	NEG	NEG	98 N	N EG	NEG
beta-BHC (f)	EPA 3550/8080	6/60	0,0002		2	9	0.001	Ð	9	9	2	9	2
beta-BHC (s)	EPA 3550/8080	6/60	0,0002		NEG	NEG	NEG	NEG	NEG	NEG	N 86	N GG	NEG
delta-BHC (f)	EPA 3550/8080	6/6n	900000		0,004	9	9	9	9	2	2	2	2
delta-BHC (s)	EPA 3550/8080	6/60	900000		NEG	NEG	NEG	N EG	NEG	S E E	98 N	SE SE	NEG
Lindane (†)	EPA 3550/8080	6/bn	0,003		9	9	9	9	2	9	2	2	9
Lindane (s)	EPA 3550/8080	6/6n	0,003		NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG	NEG
Chlordane (†)	EPA 3550/8080	6/6n	0.05		2	9	QN	9	9	2	2	9	9
Chlordane (s)	EPA 3550,8080	6/6n	0.05		NEG	NEG	NEG	NEG	NEG	N EG	NBG	NBG	NEG
4,4'-000 (†)	BA 3550/8080	6/60	0,0004		9	2	2	900*0	9	9	2	2	9
4,4'-000 (s)	EPA 3550/8080	6/6n	0,0004		NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG
4,4'-00€ (1)	EPA 3550/8080	6/60	0,007		2	9	2	0,007	9	9	9	2	9
4,4'-00E (s)	EPA 3550/8080	5/6n	0,007		NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG
4,4'-DOT (+)	EPA 3550/8080	6/6n	0,004		0,004	2	9	9	S	2	9	2	9
4,4'-00T (s)	EPA 3550/8080	6/60	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N GG	NEG

DATACHBA ANALYTICAL REPORT

Unluth IAP - Soil Samples
Second Column Confirmations

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	Method	Units	Limit	Site :	EIGH	EIGHT
Pesticides (cont.)	EPA 3550/8080	6/6n	MOL			
Aldrin (f)	EPA 3550/8080	6/6n	0,002		2	Ç
Alorin (s)	EPA 3550/8080	6/6 n	0,002		NEG	NEG
al pha-BHC (f)	EPA 3550/8080	6/6n	0,0008		₹	9
dipna-BHC (S)	EPA 3550/8080	6/6n	900000		NEG	NEG
beta-BHC (f)	EPA 3550/8080	6/6n	0,0002		2	0.12
Deta-BHC (s)	EPA 3550/8080	6/6n	0,0002		NEG	NEG
delta-BHC (f)	EPA 3550/8080	6/6n	9000000		0.001	Ş
delta-BHC (s)	EPA 3550/8080	6/6n	90000*0		POS	NEG
Lindane (†)	EPA 3550/8080	6/6n	0,003		2	æ
	EPA 3550/8080	6/6n	0.003		NEG	NEG
Chlordane (f)	EPA 3550/8080	6/6n	0,05		2	9
Chiordane (s)	EPA 3550/8080	6/6n	90.0		NEG	NEG
4,4'-000 (f)	EPA 3550/8080	6/6n	0,0004		Ð	QV
4,4'-DU (s)	EPA 3550/8080	6/6n	0,0004		NEG	NEG
	EPA 3550/8080	6/6n	0,007		Ð	9
4,4'-UUE (S)	EPA 3550/8080	6/6n	0.007		NEG	NEG
4,4*-DDT (†)	EPA 3550/8080	6/6n	0.004		9	2
4,4 - UU (S)	EPA 3550/8080	6/6n	0.004		NEG	NEG

^{*} Revised 07/10/87

DATACHEM ANALYTICAL REPORT
Duluth IAP - Solf Samples
Second Column Confirmations

					B1-A	81-A	B1-A	GW1-A	G#1-B	GM1-E		
			Detection	Field #:	0-1-9	2-5,4	5-6.5	10-11.5	5-6.5	20-21.5	SS-1A	SS-1B
Parameter	Method	Un I +s	- I = I	Site :	S.	SE	SE	S	SE	SE	S	8
Pesticides (cont.)	EPA 3550/8080	6/6n	ď									
Dieldrin (f)	EPA 3550/8080	6/6n	0,003		0.10	9	9	2	Ð	9	9	9
Dieidrin (s)	EPA 3550/8080	6/6n	0.003		POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan 1 (†)	EPA 3550/8080	6/6n	0,002		9	9	9	2	9	9	9	9
Endosultan I (s)	EPA 3550/8080	6/6n	0,002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan 11 (f)	EPA 3550/8080	6/6n	0,001		9	9	9	9	2	9	9	9
Endosulfan II (s)	EPA 3550/8080	6/6n	0,001		NEG	NEG	N B3	NEG	NEG	NEG	N BG	NEG
Endosulfan Sulfate (f)	EPA 3550/8080	6/bn	0.02		2	0.02	9	9	2	9	9	9
Endosultan Sultate (s)	EPA 3550/8080	6/6n	0,02		NEG	NEG	NEG	NEG	NEG	NEG	NBG	NEG NEG
· Endrin (+)	EPA 3550/8080	6/6n	0,005		9	2	2	9	2	2	9	9
Endrin (s)	EPA 3550/8080	6/6n	0,005		NEG	NEG	NEG	NEG	SBN	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 3550/8080	6/bn	0.02		9	₽	9	2	2	9	9	9
Endrin Aldehyde (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 3550/8080	6/6n	0.004		2	9	9	9	9	9	2	9
Heptachlor (s)	EPA 3550/8080	6/6n	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG NEG	NEG
Heptachlor Epoxide (f)	EPA 3550/8080	6/6n	0,002		9	2	9	9	9	9	9	9
Heptachior Epoxide (s)	EPA 3550/8080	6/6n	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG VEG
Toxaphene (+)	EPA 3550/8080	b/bn	0.14		2	₽	2	9	2	2	9	9
Toxaphene (s)	EPA 3550/8080	6/6n	0.14		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

Duluth IAP - Soil Samples Second Column Confirmations

					B3-A	B3-A	B3-A	B3-8	83-B	B3-8	8 3 -C	83-C	B3-C
			Detection	Field #:	0-1.5	2.5-4	5-6.5	0-1.5	2.5-4	5-6.5	0-1-5	2.5-4	5-6.5
Parameter	Me thod	un ts	Limit	Site :	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE
Pesticides (cont.)	EPA 3550/8080	6/6n	¥0,										
Dieldrin (+)	EPA 3550/8080	6/6n	0,003		9	9	9	9	9	9	9	9	9
Dieldrin (s)	EPA 3550/8080	6/6n	0,003		NEG	NEG	NEG	NEG	NEG	NEG	NBC	NEG	NEG
Endosultan ! (f)	EPA 3550/8080	6/6n	0,002		9	9	0.02	2	9	9	2	9	9
Endosultan 1 (s)	EPA 3550/8080	6/6n	0,002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N GG	NEG
Endosultan II (f)	EPA 3550/8080	6/8n	0,001		2	0.05	0.002	9	9	9	60000	0.004	0,003
Endosulfan II (s)	EPA 3550/8080	6/6n	0.001		NEG	NEG	№	NEG	NEG	NEG	NEG	98 98	NEG
Endosulfan Sulfate (f)	EPA 3550/8080	6/6n	0,02		9	ð	9	9	9	9	9	9	9
Endosultan Suitate (s)	EPA 3550/8080	6/6n	0.02		NEC	NEG	NEG	NEG	NEG	NEG	NEG	N BB	NEG
Endrin (†)	EPA 3550/8080	6/6n	0.005		2	Ð	0,002	9	9	9	9	2	9
Endrin (s)	EPA 3550/8080	6/6n	0,005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	98	NEG
Endrin Aldehyde (f)	EPA 3550/8080	6/6n	0.02		9	2	9	9	9	9	9	9	9
Endrin Aldehyde (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	98 N	NEG
Heptachlor (†)	EPA 3550/8080	6/6n	0.004		9	9	9	9	9	9	0,001	9	9
Heptachlor (s)	EPA 3550/8080	6/6n	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (1)	EPA 3550/8080	6/6n	0,002		9	9	9	9	9	9	9	9	9
Heptachlor Epoxide (s)	EPA 3550/8080	6/6n	0,002		NEG	NEG	NEG	NEG	NEG	NEG	SE S	NEG	NEG
Toxaphene (+)	EPA 3550/8080	6/6n	0.14		9	9	9	9	9	2	9	9	9
Toxapiene (s)	EPA 3550/8080	6/6n	0.14		N EG	NEG	NEG	NEG	NEG NEG	NEG	NEG	SB	NEG

Dalached AMALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

					BC-3	GW3-A	GW3-B	GW3-D			
			De tect lon	Fleid #:	5-6.5	5-6.5	5-6.5	5-6.5	SS-3A	SS-3B	SS-3C
Parameter	Method	5 15	Limit.	Site :	THREE						
Pesticides (cont.)	EPA 3550/8080	6/6n	MOL								
Dieldrin (†)	EPA 3550/8080	6/6n	0,003		9	Ð	9	₽	9	9	2
Dieldrin (s)	EPA 3550/8080	6/6n	0,003		NEG	NEG	NEG	NEG	N EG	NEG	MEG
Endosulfan 1 (†)	EPA 3550/8080	6/6n	0.002		9	9	9	ð	2	9	9
Endosulfan I (s)	EPA 3550/8080	6/6n	0,002		NEG	N EG	NEG	NEG	NEG	NEG	NEG
Endosultan 11 (†)	EPA 3550/8080	6/6n	0.001		2	0.004	2	9	Ð	2	9
Endosulfan II (s)	EPA 3550/8080	6/6n	0,001		NEG	NEG	N BG	NEG	NEG	NEG	NEG
Endosultan Sultate (†)	EPA 3550/8080	6/bn	0.02		2	9	Ş	9	0,31	90.0	0.01
Endosuitan Sulfate (s)	EPA 3550/8080	6/6n	0,02		NEG	NEG	NEG	NEG	Pos	8	NEG
Endrin (+)	EPA 3550/8080	6/5n	0,005		9	9	2	2	2	9	9
Endrin (s)	EPA 3550/8080	6/6n	0,005		NEG						
Endrin Aldehyde (†)	EPA 3550/8080	6/6n	0.02		9	Q	9	Ş	Ş	2	2
Endrin Aldehyde (s)	EPA 355C/8080	6/6n	0,02		NEG						
Heptachlor (f)	EPA 3550/8080	6/6n	0.004		9	9	Ş	2	2	9	9
Heptachlor (s)	EPA 3550/8080	6/6n	0.004		NEG						
Heptachlor Epoxide (f)	EPA 3550/8080	6/6n	0,002		9	9	9	Ð	ð	9	9
Heptachlor Epoxide (s)	EPA 3550/8080	6/6n	0,002		NEG						
Toxaphene (+)	EPA 3550/8080	6/6n	0.14		9	Ş	2	2	ð	9	9
Toxaphene (s)	EPA 3550/8080	6/6n	0.14		NEG						

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DATACHEM ANALYTICAL REPORT Dufuth IAP - Soil Samples Second Column Confirmations

					GW5-A	GW5-B	GW5-C					
			40.400	1010		9.5-11	5-11-01	SS-5A	SS-5B	SS-5C	25-50	SS-5E
	1	in) ts	Uerecison Limit	Si te	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE
707 00010												
Pesticides (cont.)	EPA 3550/8080	6/6n	Ð									
		-/	100		9	2	₹	2	2	2	2	9
Dieldrin (†) Dieldrin (s)	EPA 3550/8080	6/6n	0,003		NEG T	NEG	NEG	NEG	NEG NEG	NEG	NEG S	NEG
		•	6		5	9	9	2	2	9	9	9
Endosultan 1 (f) Endosultan 1 (s)	EPA 3550/8080 EPA 3550/8080	6/6n	0,002		NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
		•	0		9	Ş	9	9	Ş	9	2	Ş
Endosulfan II (f) Endosulfan II (s)	EPA 3550/8080 EPA 3550/8080	6/6n	0,001		NEG E	NEG	N EG	NEG	NEG	N EG	NEG	NEG
	,		6		Ş	Ş	9	2	2	9	2	0.02
Endosulfan Sulfate (f) Endosulfan Sulfate (s)	EPA 3550/8080 EPA 3550/8080	6/6n	0.02		NEG E	NEG NEG	9	NEG	NEG	NEG	NEG	NEG
					9	Ş	Ş	Ş	2	2	2	9
Endrin (f)	EPA 3550/8080 EPA 3550/8080	6/6n	0,005 0,005		N S	SE SE	8 SB	NEG .	NEG	NEG	SB	NEG
						ģ	ş	Ş	9	9	2	2
Endrin Aldehyde (†) Endrin Aldehyde (s)	EPA 3550/8080 EPA 3550/8080	6/6n 6/6n	0.02 0.02		NEG NE	NEG Z	2 8g	NEG 6	NEG NEG	NEG	N EG	NEG
					Ş	ş	2	9	2	2	2	2
Heptachlor (†) Heptachlor (s)	EPA 3550/8080 EPA 3550/8080	6/6n	0.004		NEG N	NEG	NEG	NEG	NEG	NEG	SB	NEG
			•		9	Ş	Ş	9	9	9	ş	Ş
Heptachlor Epoxide (f) Heptachlor Epoxide (s)	EPA 3550/8080 EPA 3550/8080	6/6n 6/6n	0.002		S S	9 9 8	SE	NEG	NEG	NEG	SEC.	NEG
		•	•		9	Ş	9	2	2	2	2	2
Toxaphene (f) Toxaphene (s)	EPA 3550/8080 EPA 3550/8080	6/6n 6/6n	0.14		NEG	N N N N N N N N N N N N N N N N N N N	N BC	NEG	NEG	NEG	89 89	NEG S

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DATACHEM MALYTICAL REPORT
Duluth IAP - Soll Samples
Second Column Confirmations

					B7-A	B7-A	87 - B	B7-B	GW7A	GW7-B	O#7 -C	
			Detection	Field #:	0-1.5	2.5-4	0-1-5	2.5-4	10-11.5	10-11.5	15-16.5	SS-7A*
Parameter	Method	ch i ts	Limit	\$179 :	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN	SEVEN
Pesticides (cont.)	EPA 3550/8080	6/6n	MDL									
Dieldrin (†)	EPA 3550/8080	6/60	0.003		Ð	9	2	₽	ð	Ş	9	9
Dieldrin (s)	EPA 3550/8080	6/6n	0,003		NEG	NEG	NEG	NEG	NEG	N E G	NEG	NEG
Endosulfan I (†)	EPA 3550/8080	6/6n	0,002		2	9	9	Ş	2	9	Q	2
Endosuitan ! (s)	EPA 3550/8080	6/6n	0,002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosultan (†)	EPA 3550/8080	b/bn	0,001		9	2	9	S	2	2	9	9
Endosultan 11 (s)	EPA 3550/8080	6/6n	0.001		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosultan Sultate (f)	EPA 3550/8080	5/ 5 n	0.02		Q	Q	9	오	2	2	9	9
Endosuitan Suitate (s)	EPA 3550/8080	6/6n	0,02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin (f)	EPA 3550/8080	6/60	0,005		9	9	9	2	2	2	2	9
Endrin (s)	EPA 3550/8080	6/6n	0,005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 3550/8080	b/bn	0.02		Ş	9	9	2	9	9	9	9
Endrin Aldehyde (s)	EPA 3550,8080	6/60	0,02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 3550/8080	6/bn	0,004		g	Q	9	Ş	9	Q	9	Q
Heptachlor (s)	EPA 3550/8080	b/6 n	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 3550/8080	6/6n	0.002		Q	Q	2	Ð	9	Ş	2	9
Heptachlor Epoxide (s)	EPA 3550/8080	6/6n	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toxaphene (f)	EPA 3550/8080	6/6n	0.14		S	9	2	Ç	ð	9	ð	Q
Toxaphene (s)	EPA 3550/8080	6/6n	0.14		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

* Revised 07/10/87

DATACHER MARLYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

					B8-A	B8A	B8-A	88-B	88 49	98	CWB-A	GW8-B	GWB-C
Parameter	Me thod	Un its	Detection Limit	Field #: Site :	0-1.5 EIGHT	2.5-4 EIGHT	5-6.5 EIGHT	0-1.5 E1GHT	2.5-4 EIGHT	5-6.5 E10HT	5-6.5 EIGHT	10-11.5 EIGHT	10-11.5 EIGHT
Pesticides (cont.)	EPA 3550/8080	6/6n	MC										
Dieldrin (†)	EPA 3550/8080	6/ 6 n	0,003		9	9	9	9	9	9	2	2	9
Dieldrin (s)	EPA 3550/8080	6/6n	0.003		NEG	NEG							
Endosultan (t)	EPA 3550/8080	6/bn	0,002		9	9	9	2	9	2	9	2	9
Endosultan I (s)	EPA 3550/8080	6/6n	0,002		NEG	N 88	NEG	NEG	NEG	NEG	88	S R	NEG
Endosulfan 11 (f)	EPA 3550/8080	b/bn	0.001		0.001	9	Q	2	9	9	2	9	9
Endosultan II (s)	EPA 3550/8080	6/6n	0.001		NEG	N EG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosultan Sultate (f)	EPA 3550/8080	0/00	0.02		0,002	9	0.005	9	9	0,002	0.001	2	2
Endosultan Sultate (s)	EPA 3550/8080	6/6n	0.02		N EG	NEG	NEG N	NEG	NEG	93 N	N EG	99 N	NEG
Endrin (f)	EPA 3550/8080	b/bn	0,005		9	9	2	2	2	9	9	9	2
Endrin (s)	EPA 3550/8080	6/6n	0,005		NEG	N EG	NEG	NEG NEG	NEG	NEG NEG	SEC	9 9	NEG
Fodrin Aldehyde (†)	EPA 3550/8080	0/00	0.02		9	9	9	2	2	2	9	9	2
Endrin Aldehyde (s)	EPA 3550/8080	6∕6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG NEG	N EG	NEG	NEG
Hentachlor (f)	EPA 3550/8080	b/bn	0,004		9	Ð	2	9	9	9	9	9	9
Heptachlor (s)	EPA 3550/8080	6/6n	0,004		NEG	NEG							
Heotachlor Enoxide (†)	EPA 3550/8080 .	b/bn .	0,002		æ	2	S	2	9	9	9	9	9
Heptachlor Epoxide (s)	EPA 3550/8080	6/6n	0,002		NEG	NEG	NEG	NEG	SB	NEG	NEG	N EG	NEG
Toxanhene (f)	EPA 3550/8080	b/bn	0,14		9	₹	2	9	9	2	9	9	2
Toxaphene (s)	EPA 3550/8080	6/6n	0.14		NEG	NB6	NEG						

DATACHEN AMALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

			De tect ion	Fleid #:	SS-8A*	SS-8B*	
Par ameter	Method	Units	Limit	Site :	E1 GHT	EIGHT	
Pesticides (cont.)	EPA 3550/8080	6/6n	MOL				
Dieldrin (f)	EPA 3550/8080	6/6n	0,003		2	ON	
Dieldrin (s)	EPA 3550/8080	6/6n	0,003		NEG	NEG	
Endosulfan I (f)	EPA 3550/8080	6/6n	0,002		2	0.01	
Endosultan 1 (s)	EPA 3550/8080	6/6n	0.002		NEG	POS	
Endosulfan 11 (f)	EPA 3550/8080	6/6n	0,001		2	9	
Endosulfan II (s)	EPA 3550/8080	6/6n	0.001		NEG	NEG	
Endosultan Suitate (f)	EPA 3550/8080	6/6n	0.02		9	QN	
Endosulfan Sulfate (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	
Endrin (f)	EPA 3550/8080	6/6n	0,005		9	Ð	
Endrin (s)	EPA 3550/8080	6/6n	0.005		NEG	NEG	
Endrin Aldehyde (f)	EPA 3550/8080	6/6n	0.02		2	g	
Endrin Aldehyde (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	
Heptachior (f)	EPA 3550/8080	6/6n	0.004		2	9	
Heptachlor (s)	EPA 3550/8080	6/6n	0.004		NEG	NEG	
Heptachlor Epoxide (f)	EPA 3550/8080	6/6n	0,002		9	Q	
Haptachlor Epoxide (s)	EPA 3550/8080	6/6n	0.002		NEG	NEG	
Toxaphene (†)	EPA 3550/8080	6/6n	0.14		9	QN	
Toxaphene (s)	EPA 3550/8080	6/6n	0.14		NEG	NEG	

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DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

					B1-A	81-A	B1-A	GW1-A	GW1-B	£1-E		
			Defection	Field #:	0-1-5	2-5.4	5-6.5	10-11,5	5-6.5	20-21,5	SS-1A	SS-1B
Parameter	Me thod	Un i ts	Limit	Site :	ONE	ONE.	ONE	ONE	ONE	ONE.	ONE	ONE
Pesticides (cont.)	EPA 3550/8080	6/ 6 n	Į.									
Arochior 1016 (f)	EPA 3550/8080	6/6n	0,02		9	9	2	2	9	9	2	ş
Arochior 1016 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	99 N	S R	NEG
Arochior 1221 (f)	EPA 3550/8080	6/6n	0.02		9	2	9	2	9	9	Ð	2
Arochlor 1221 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	N EG	NEG	NEG	N EG	NEG
Arochlor 1232 (f)	EPA 3550/8080	6/6n	0.02		9	9	₽	2	2	9	Ð	2
Arochlor 1232 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG NEG	NEG
Arochi or 1242 (f)	EPA 3550/8080	6/6n	0.02		9	9	9	2	9	2	2	9
Arochior 1242 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochior 1248 (1)	EPA 3550/8080	6/6n	0.02		2	9	9	2	2	9	2	9
Arochlor 1248 (s)	EPA 3550/8080	6/6n	0.02		NEG	N BG	NEG	NEG	NEG	NEG	99	NEG
Arochlor 1254 (f)	EPA 3550/8080	6/6n	0.02		9	9	9	9	2	2	2	9
Arochlor 1254 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG S	NEC	NEG	NEG
Arochior 1260 (f)	EPA 3550/8080	6/6n	0.02		9	Q	2	2	9	2	2	9
Arochlor 1260 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

DATACHBA ANALYTICAL REPORT

se lds	rmations
Soil Samp	Confirm
N - S	Co}n∎n Co
Duluth 17	
100	Second

83-C 5-6.5 THREE	S S S	NEG NEG	NEG NEG	9 99	NEG NEG	A REG	NEG G
83-C 2.5-4 THREE	NEG NEG	A A A	3 8	N RS	5 55 55 55 55 55 55 55 55 55 55 55 55 5	SES SES	Q Si
83-C 0-1.5 THREE	2 99	5 8 8	NEG NEG	2 8	2 8	Ø 98	9 B
83-8 5-6.5 THREE	NEG NEG	S SS	N RS	N N N	NEG N	N KE	N N N N N N N N N N N N N N N N N N N
83-8 2.5-4 THREE	2 99	NEG	⊋ 8	Q Sa w	9 99 N	S S S	2 8
83-8 0-1.5 THREE	NEG NEG	S S	A SH	S S	NEG N	S S S	S S S
83-A 5-6.5 THREE	99 8	9 88 88	S S	9 g	N KEG	2 99 2	NEG N
83-A 2.5-4 THREE	NEG NEG	NEG NO	N N N N N N N N N N N N N N N N N N N	Q 93	ð Sä	N EG	S S S
83-A 0-1.5 THREE	S E	S SS	g g	S &	NEG NG	NEG N	N NEG
Field #: Site :							
Detection	# 0.02	0.02	0.02	0.02	0.02	0.02	0,02
un its	6/6n	6/6n	5 / 6 m	6/6n	6/6n	6/6n	6/6n 6/6n
Me thod	EPA 3550/8080 EPA 3550/8080	EPA 3550/8080 EPA 3550/8080	EPA 3550/8080	EPA 3550/8080 EPA 3550/8080	EPA 3550/8080	EPA 3550/8080 EPA 3550/8080 EPA 3550/8080	EPA 3550/8080 EPA 3550/8080
Parose ter	s (cont.)	1016 (s)	1221 (5) 1232 (f)	1232 (s)	Arochlor 1242 (s) Arochlor 1248 (†)	Arochlor 1248 (s) Arochlor 1254 (f)	Arochior 1260 (f) Arochior 1260 (s)
	Pesticides (cont.) Arochior 1016 (f)	Arochlor 1016 (s)	Arochior 1221 (s) Arochior 1232 (f)	Arochlor 1232 (s) Arochlor 1242 (f)	Arochior 1242 (s) Arochior 1248 (†)	Arochior Arochior	Arochior Arochior Arochior

DATACHEM AMALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

					8C-3	GW3-A	SW3-B	GW3-D			
			Detection	Fleid #:	5-6.5	5-6.5	5-6-5	5-6.5	SS-3A	55-38	SS-3C
Parameter	Method	Units	Limit	Site :	THREE	THREE	THREE	THREE	THREE	THREE	THREE
Pesticides (cont.)	EPA 3550/8080	6/6n	MDF								
Arochior 1016 (†)	EPA 3550/8080	6/6n	0,02		9	9	2	9	9	9	2
Arochior 1016 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NBC	NEG
Arochlor 1221 (f)	EPA 3550/8080	6/6n	0,02		9	2	2	2	9	2	2
Arochlor 1221 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 3550/8080	6/ 6 n	0.02		2	Q	2	9	2	2	9
Arochlor 1232 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochior 1242 (f)	EPA 3550/8080	6/6n	0.02		2	9	Ð	9	Ð	9	2
Arochlor 1242 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1248 (f)	EPA 3550/8080	6/6n	0.02		2	9	2	₽	9	9	Ş
Arochlor 1248 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochior 1254 (f)	EPA 3550/8080	6/6n	0,02		9	9	9	9	9	9	9
Arochior 1254 (s)	EPA 3550/8630	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1260 (f)	EPA 3550/8080	6/6n	0,02		2	9	2	2	-	0.17	0.04
Arochior 1260 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	NEG	NEG	POS	POS	POS

DATACHER AWALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

DATACHEM AMALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	We thod	un its	Detection Limit	Fleid #: Site :	B7-A 0-1.5 SEVEN	87 -A 2.5-4 SEVEN	87-8 0-1.5 SEVEN	87-8 2.5-4 SEVEN	GW7 -A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A*
Pesticides (cont.)	EPA 3550/8080	6/6n	MDL 0.02		9	9	9	9	9	9 5	Q 2	N N
Arochior 1016 (f) Arochior 1016 (s)	EPA 3550/8080	5/6n	0.02		NEG	NEG	NEG E	S SEC		8 9	9	9
Arochlor 1221 (f) Arochlor 1221 (s)	EPA 3550/8080 EPA 3550/8080	6/6n 6/6n	0.02		NEG P	NEG NEG	NEG NEG	NEG	NEG NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 3550/8080 EPA 3550/8080	6/6n 6/6n	0.02		N P	NEG NEG	NEG NEG	NEG NEG	9 S	NEG AD	ON NEG	NEG 20
Arochlor 1242 (f)	EPA 3550/8080 FPA 3550/8080	6/6n 6/6n	0.02		ND NEG	S S	NO NEG	NEG NE	NEG NO	NEG NEG	S S S	NEG PG
Arochior 1248 (f)	EPA 3550/8080 EPA 3550/8080	6/6n 6/6n	0.02		ND NEG	ND NEG	NEG NG	O S	NEG N	N EG	NEG NEG	N NEG
Arochlor 1254 (f) Arochlor 1254 (s)	EPA 3550/8080 EPA 3550/8080	6/6n 6/6n	0.02		ND NEG	ND NEG	ND	N SEG	NEG NEG	NEG NO	N ES	S S
Arachlor 1260 (f) Arachlor 1260 (s)	EPA 3550/8080 EPA 3550/8080	6/6n 6/6n	0.02		ND NEG	N NEG	ND N EG	ND NEG	N NEG	N NEG	NEG NEG	NEG EG

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DATACHBA AMALYTICAL REPORT Duluth IAP - Soll Samples Second Column Confirmations

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

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			Detection	Field #:	SS-8A*	SS-88*	
Parameter	Method	Units	Limit	Site :	E1 GHT	EIGHT	
Pesticides (cont.)	EPA 3550/8080	6/6n	MDL				
Arochior 1016 (f)	EPA 3550/8080	6/6n	0,02		9	ND	
Arochlor 1016 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	
Arochlor 1221 (f)	EPA 3550/8080	6/6n	0,02		9	Q	
Arochior 1221 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	
Arochior 1232 (f)	EPA 3550/8080	6/6n	0.02		2	Q	
Arochi or 1232 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	
Arochior 1242 (f)	EPA 3550/8080	6/6n	0,02		2	N	
Arochlor 1242 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	
Arochlor 1248 (f)	EPA 3550/8080	6/6n	0,02		9	ON	
Arochior 1248 (s)	EPA 3550/8080	6/6n	0.02		NEG	NEG	
Arochlor 1254 (†)	EPA 3550/8080	6/6n	0,02		2	0.52	
Arochlor 1254 (s)	EPA 3550/8080	6/6n	0.02		NEG	Pos	
Arochlor 1260 (f) Arochlor 1260 (s)	EPA 3550/8080 EPA 3550/8080	6/6n 6/6n	0.02		NEG WEG	NU NEG	

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

					B1-A	B1-A	B1-A	GW1-A	<u>-</u>	₹ -E		
			Detect ion	Field #:		2.5-4	5-6.5	10-11.5	5-6.5	20-21.5	SS-1A	82-18
Parameter	Me thod	Units	Limit	Site :	ONE	ONE	ONE	ONE	S	ONE	S	S
Herbicides	EPA 3550/8150	6/6n	MOL									!
2,4,5-T (†) 2,4,5-T (s)	EPA 3550/8150 EPA 3550/8150	6/6n 6/6n	0.10		NEG NO	NEG N	NEG NEG	2 9	S S	N PO	NEG &	NEG PEG
2,4-0 (f) 2,4-0 (s)	EPA 3550/8150 EPA 3550/8150	6/6n 6/6n	0.02		S S	0,082 NEG	NEG NO	NEG NE	S S	S S	N S	NEG N
Silver (f) Silver (s)	EPA 3550/8150 EPA 3550/8150	6/6n 6/6n	0.02		G SB	NEG N	2 9	ð 33 SE	NEG NO	S S	N N N N	NE G

DATACHEN AMALYTICAL REPORT Duluth IAP - Soli Samples Second Column Confirmations

Parameter	Me thod	Un I ts	Detection Limit	Field #: Site :	83-A 0-1.5 THREE	83-A 2.5-4 THREE	83-A 5-6.5 THREE	83-8 0-1 ₋ 5 THREE	83-8 2.5-4 THREE	83-8 5-6.5 THREE	83-C 0-1.5 THREE	83-C 2.5-4 THREE	83-C 5-6.5 17-REE
Harb Ic ides	EPA 3550/8150	6/6n	덪										
2,4,5-T (f) 2,4,5-T (s)	EPA 3550/8150 EPA 3550/8150	6/6n 6/6n	0.10		NEG NEG	N G	N NO	NEG 6	2 8	0 9	NE SE	2 8	NE C
2,4-0 (f) 2,4-0 (s)	EPA 3550/8150 EPA 3550/8150	6/6n 6/6n	0.02		NEG NEG	NEG NE	2 99	NEG NO	NEG NEG	NEG NEG	NEG N	9 8 8 9 8	NEG D
Silvex (f) Silvex (s)	EPA 3550/8150 EPA 3550/8150	6/6n 6/6n	0.02 0.02		NEG	NEG	G S	0, 18 NEG	0.23 NEG	NEG NEG	N PO	S SS	NEG NEG

DATACHER ANALYTICAL REPORT Duluth IAP - Soil Samples Second Column Confirmations

SS-3C THREE	ON NEG	NEG NEG	NEG NEG
SS-38 THREE	N D NEG	NEG NEG	NEG NEG
SS-3A THREE	N EG	NEG N	NEG NEG
GW3-D 5-6.5 THREE	NEG NO	NEG NO	ON SER
343-8 5-6.5 THREE	2 8	NEG NEG	NEG NO
GW3-A 5-6.5 THREE	S S	N SES	N EG
8C-3 5-6.5 THREE	NEG NEG	N Sa	NEG NEG
Field #:			
Detection Limit	MDL 0.10 0.10	0.02	0.02
en its	6/6n 6/6n 6/6n	6/6n 6/6n	6/6n 6/6n
Me thod	EPA 3550/8150 EPA 3550/8150 EPA 3550/8150	EPA 3550/8150 EPA 3550/8150	EPA 3550/8150 EPA 3550/8150
Par anoter	Harbicides 2,4,5-T (†) 2,4,5-T (s)	2,4-0 (†) 2,4-0 (s)	S11 vex (f) S11 vex (s)

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					GW 5A	GW5-B	GW5-C						B7-A
			Detection	Field #:	5-6.5	9.5-11	10-11.5	SS-5A	SS-58	SS-5C	SS-50	SS-5E	0-1.5
Parameter	Me thod	th ts	Limit	Site :	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE	SEVEN
Herbicides	EPA 3550/8150	6/6n	덫										
2,4,5-T (f)	EPA 3550/8150	6/6n	0.10		9	₹	9	9	9	2	2	9	2
2,4,5-T (s)	EPA 3550/8150	6/6n	0.10		NEG	NEG	NEG	NEG	¥ EC	NEG	NEG	NEG	NEG
2,4-0 (+)	EPA 3550/8150	6/6n	0.02		2	2	2	2	9	2	2	9	9
2,4-0 (s)	EPA 3550/8150	6/6n	0.02		NEG	NEG	NEG	NEG	N EG	NEG	NBC	N EG	NEG
Silvex (f)	EPA 3550/8150	6/ 6 n	0.02		2	ð	9	2	2	2	2	2	9
Silvex (s)	EPA 3550/8150	6/6n	0,02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

DATACHEN ANALYTICAL REPORT
Duluth IAP - Soil Samples
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SS-88*	Ş	S S S	N NEG	N NEG
SS-8A*	9	2 SE	NEG &	NEG NO
SS-7A*	ç	N SE	2 9	A 88
GW7-C 15-16.5 SEVEN	Š	N EG	N NEG	NEG NG
GW7-B 10-11.5 SEVEN	!	NEG 5	NEG NEG	N EG
GW7-A 10-11.5 SEVEN	i	NEG NEG	SEG P	N EG
87-8 2.5-4 SEVEN		NEG A	NEG NEG	ND NEG
87-8 0-1.5 SEVEN		NEG Æ	ND NEG	N EG
87-A 2.5-4 SEVEN		NEG NEG	0.12 NEG	N EG
Fleid #: Site :				
Detection Limit	Ą	0.10	0.02	0.02
Units	6/6n	6/6n 6/6n	6/6n 6/6n	6/6n 6/6n
Method	EPA 3550/8150	EPA 3550/8150 EPA 3550/8150	EPA 3550/8150 EPA 3550/8150	EPA 3550/8150 EPA 3550/8150
Parameter	Harbicides	2,4,5-T (†) 2,4,5-T (s)	2,4-0 (†) 2,4-0 (s)	Silver (f)

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* Revised 07/10/87

	:	:	Detect lon	F1 e1 d #:	B8-A 0-1.5	B8-A 2.5-4	B8-A 5-6.5	88-8 0-1.5	88-B 2,54	88 4 7.6.55 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	GW8-A 5-6.5	648-8 10-11.5	6W8-C 10-11.5
Parameter	Me thod	اج اج	- E		5	5	5	5	5	5	5	100	5
Herbicides	EPA 3550/8150	6/6n	ᅜ										
2,4,5-T (+)	EPA 3550/8150	6/ 6 n	0.10		9	£	9	2	9	9	9	2	9
2,4,5-T (s)	EPA 3550/8150	6/6n	0, 10		NEG	SEG	NEG	NEG	NEG	NEG NEG	SE SE	88 88	NEG
2,4-0 (+)	EPA 3550/8150	6/6n	0,02		9	Ð	Ş	9	9	9	Q	2	2
2,←0 (s)	EPA 3550/8150	6/6n	0.02		NEG	NEG	NEG	NEG	NEG	NEG	SE EG	NEG	NEG
Silvex (f)	EPA 3550/8150	6/6n	0,02		9	ð	9	9	2	9	9	9	9
Silver (s)	EPA 3550/8150	6/6n	0,02		NEG	NEG	NEG S	NEG	NEG	N BG	SBN SBN	NEG	NEG

DATACHEM ANALYTICAL REPORT
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			Detection	Field #:	GW1-A	G#1-C	GW1-D	G#1-E	SW-1A	SE-18	GW2-A	GW2-8	€ 2-c
Par anater	Method	units.	Limit	Site :	ONE	ONE	ONE	ONE	ONE	ONE	TWO	OMT.	TWO
Purgeable Halocarbons	EPA 601	ng/L	MDL										
Chloramethane (f)	EPA 601	ng/r	0,49		9	Q	9	9	9	9	9	9	9
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	N 66	NEG						
· Methylene Chloride (†)	EPA 601	1/8 1	0.34		2	9	Ş	Ş	9	2	9	9	2
Methylene Chioride (s)	EPA 601	η	0,34		NEG	NEG	98 N	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 601	ug/L	0.46		9	2	9	9	2	9	9	2	2
Carbon Tetrachloride (s)	EPA 601	ng/L	0,46		NEG	N EG	NEG						
Bromodichioromethane (f)	EPA 601	ug/L	0.35		9	9	9	9	9	9	9	2	9
Bromodichloromethane (s)	EPA 601	ng/L	0,35		NEG								
Dibromochloromethane (+)	EPA 601	ng/L	0,31		2	9	9	9	g	2	2	9	2
Dibramochioramethane (s)	EPA 601	ug/L	0,31		NEG								
Bromomethane (f)	EFA 601	ng/L	0,63		9	9	9	9	9	9	Ð	9	2
Brownethane (s)	EPA 601	ng/L	0,63		NEG	N SS	NEG						
Dichlorodifluoromethane (f)	EPA 601	ng/L	0,33		9	9	9	9	2	9	2	2	9
Dichlorodifluoromethane (s)	EPA 601	ng∕L	0,33		NEG								
Trichlorofluoromethane (f)	EPA 601	ug/L	0.44		9	2	2	9	9	9	2	₽	9
Trichlorofluoromethane (s)	EPA 601	ug/L	0.44		NEG								
Chloroform (f)	EPA 601	J/gv	0.45		9	9	2	2	2	2	9	2	9
Chloroform (s)	EPA 601	ng/L	0.45		NEG	NEG	NEG	NEG	NEG	N EG	NEG	SBN	NEG
Bramoform (f)	EPA 601	ng/L	0.45		9	GN	9	9	Q	9	9	2	9
Bromoform (s)	EPA 601	ng/L	0.45		NEG								

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"ND" indicates that the parameter was not detected.

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			Detection	Fleid #:	GW2-D	GW2-E	SW-2A	SW-2B	SM-2C	MM-1	MM-2	MM-4	<u>7</u> -15
Par and ter	Method	Units		Site :	OM.	J.	OML	TWO	O#L	OF C	TWO	9	OM
Purgeable Halocarbons	EPA 601	ug/L	MOF										
	104 400	1,5	0.49		9	Ş	2	2	2	2	2	9	2
Chloromethane (1)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NE G
	107 702	,	7.0		Ş	2	2	6.0	9	9	9	9	g
Methylene Chloride (†) Methylene Chloride (s)	EPA 601	ug∕r ug∕r	0.34		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
		:	9		Ş	Ş	9	9	9	ð	9	2	9
Carbon Tetrachloride (†) Carbon Tetrachloride (s)	EPA 601	ug/L	0.46		NEG	NEG NEG	NEG	NEG	NEG	NEG	NEG	NEG	NE G
;	107	,	75		2	£	2	2	2	9	Ð	9	2
Bromodichloromethane (f) Bromodichloromethane (s)	EPA 601	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
	; ;		;		9	Ş	9	9	2	2	2	2	2
Dibromochloromethane (f)	EPA 601	ug/L	0.31		NEG E	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
)						•	9	ģ	9	Ş	Ş
Bromomethane (+)	EPA 601	J/gu	0,63		2	2	9	9	2	⊋ ;	3 §	⊋ {	<u> </u>
Bromomethane (s)	EPA 601	ug/L	0.63		NEG	NEG	NEG	SEC	982	SEC NEC	71 2	9 9 9	S L L
	FPA 601	1/01	0.33		9	₽	2	g	9	9	9	2	9
Dichlorodi fluoromethane (s)	EPA 601	1/6n	0,53		NEG	NEG	NEG	NEG	NEG	NEG	NEG	S S	NEG
	FD# 601	7/9	0 44		2	2	2	9	2	9	9	9	9
Trichiorofiuoromethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	N EG	N EG	NEG
:	104 401	2	0.45		9	2	9	9	2	2	ð	2	9
Chloroform (f) Chloroform (s)	EPA 601	1,8 1,7 1,0 1,0 1,0 1,0 1,0 1,0 1,0 1,0 1,0 1,0	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
:	9	7,01	6.45		9	ĝ	Ş	9	2	9	2	2	9
Branctorm (t) Branctorm (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG

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Per aneter	Wethod	Un 1 rs	Defection	Fleid#: Site :	NW-6 TWO	TWO	OW3-A THREE	GW3-8 THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
Purgeable Halocarbons	EPA 601	ug/L	MDL										
	(09 Vds	1/00	0.49		2	2	2	2	2	9	2	2	2
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	23 22	NEG	NEG
	3	5	25		9	4.4	9	2	2	2	2	2	9
Nethylene Chloride (†) Nethylene Chloride (s)	EPA 601	ug/L	0.34		S S	Pos	NEG	NEG E	NEG	NEG	2 2 2 3	N EG	NEG
	į	Š	74.0		Ş	Ş	Ş	9	3	2	2	2	9
Carbon Tetrachloride (†) Carbon Tetrachloride (s)	EPA 601	1/g/ 1/g/	0.46		98	NEG	NEG	NEG	NEG	NEG	SEC	SB	NEG
	109	į	75		9	9	9	2	2	2	0.87	2	9
Brancalchloramethane (1) Brancalchloramethane (5)	EPA 601	ug/r	0.35		NEG	NEG	NEG	NEG	NEG	NEG	Pos	NEG	NEG NEG
	3	(5		9	9	2	9	2	1.0	9	Ş	9
Dibraschi orasethane (†)	EPA 601	7/6n	0.31		NEG I	NEG	NEG	NEG	NEG	P05	N ES	N EG	NEG
		'n											!
Broncesthana (f)	EPA 601	ng/⊾	0,63		2	2	2	9	9	9	2 9	9 §	9 9
Bromomethane (s)	EPA 601	ug/L	0,63		NEG	NEG	NEG	NEG	NEG	S S S	91 Z	S	N S S S S
	FPA 601	(/011	0.33		9	£	2	9	2	9	ð	2	3
Dichlorodificomethane (s)	EPA 601	ng/L	0,33		NEG	NEG	NEG	NEG	NEG	S R R	9 2	9	NEG NEG
	FPA 601	וומ/ו	0.44		2	0.88	ð	9	9	2	9	9	2
Trichlorofluoromethane (s)	EPA 601	ng/L	0.44		NEG	POS	NEG	NEG	NEG	NEG	NEG NEG	9	NEG
	FDA 603	700	0.45		£	2	2	3,6	2	2.3	9	1.6	1.4
Chloroform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	POS	NEG	Pos	SEG EG	So.	SO S
:	104 601	1/61	0 A 5		9	2	2	2	9	2	9	윷	9
Brancform (f) Brancform (s)	EPA 601	1/6n	0.45		NEG	NEG	NEG	NEG	N EG	NEG	N EG	N EG	NE G

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			Detection	Field *	GW4-A	GW4-R	0.44.C	G-M4-D	SW-AA	4 P	74.40	CA-MO	8
Parameter	Method	un its	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgeable Halocarbons	EPA 601	ng/r	MOL										
Chloromethane (f)	EPA 601	ug/L	0,49		2	9	9	9	9	9	9	9	9
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG SEG	NEG	NEG	NEG	NEG
Methylene Chioride (f)	EPA 601	ug/L	0.34		9	2	9	2	2.1	2.3	2.8	3.5	Ð
Methylene Chloride (s)	EPA 601	ug/L	0,34		NEG	NEG	NEG	NEG	Pos	POS	Pos	POS	NEG
Carbon Tetrachloride (f)	EPA 601	ug/L	0.46		9	2	9	2	2	웆	9	9	Ð
Carbon Tetrachloride (s)	EPA 601	ug/L	0,46		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromodichloromethane (f)	EPA 601	ug/L	0,35		2	9	9	9	9	94	•55	•58	9
Bromodichloromethene (s)	EPA 601	ug/L	0,35		NEG	NEG	NEG	NEG	NEG	NEC	NEG	NEG	NEG
Dibramochloramethane (f)	EPA 601	ng/r	0,31		9	2	9	9	9	9	9	9	9
Dibromochioromethane (s)	EPA 601	ug/L	0,31		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 601	ug/L	0.63		2	9	æ	9	2	9	2	9	9
Bromomethene (s)	EPA 601	ng/L	0.63		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 601	ug/L	0,33		9	ð	Ş	9	9	9	9	9	9
Dichlorodifiuoromethane (s)	EPA 601	ug/L	0,33		NEG	NEG	NEG	NEG	NEG	N EG	NES	NEG	NEG
Trichlorofluoromethene (f)	EPA 601	ug/L	0.44		9	9	9	9	2	9	9	9	5,5
Trichlorofluoromethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	N EG	NEG	NEG	NEG N	NEG	POS
Chloroform (f)	EPA 601	ug/L	0.45		2	9	9	9	2	9	9	9	9
Chloroform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG
Bramoform (f)	EPA 601	ug/L	0.45		9	2	2	2	ð	9	Q	9	9
Bramoform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

DATACHER ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

			Detection	Fleid#:	6-M	MM-10	11-14W	GW5-A	G#5-B	G#(5-C	S4-5A F I VF	SM-58 F I VE	SW-5C FIVE
Paramater	Method	E ts	Limit	Si te :	X X	Y C	50	3					
Purgeable Halocarbons	EPA 601	ng∕L	¥0										
	109 AG2	1/01	0.49		9	2	2	2	윷	9	9	2	9
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG EG	99 89	99 93	NEG
;		7	5		9	9	2	2	9	2	2.7	2.9	æ
Methylene Chloride (†) Methylene Chloride (s)	EPA 601	ug/L	, °,		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
;		7 !!	7 0		9	9	2	9	2	2	9	2	9
Carbon Tetrachloride (†) Carbon Tetrachloride (s)	EPA 601	ng/r ng/r	0.46		N EG	NEG NEG	NEG	NEG	NEG	NEG	N EG	N EG	NEG
:	100	,	5		9	2	2	2	2	9	9	9	9
Browndichloromethane (f) Browndichloromethane (s)	EPA 601	ng/r	0.35		N EG	NEG	NEG	NEG	NEG	NEG	SBN	NEG	NEG
		4			9	Ş	Ş	Ş	9	2	9	9	2
Dibramochloramethane (f)	EPA 601	- - - - -	0.51		ي و	N C	AFG.	NEG	NEG	NEG	SBN	NEG	NEG
Dibromochioromethane (s)	EPA 601	1/6n	<u>.</u>		3	3	}	<u>.</u>					
;	104 KO1	7	9 0		2	9	2	2	Ð	2	2	9	2
Branchethane (1) Branchethane (5)	EPA 601	ug/L	0.63		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
;		1	22		9	g	9	2	9	9	9	2	2
Dichlorodifiuoramethane (f) Dichlorodifiuoramethane (s)	EPA 601	ug/L	0.33		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
;	į	Ì			Ş	Ş	1.9	2	Ş	9	2	9	9
Trichlorofluoromethane (f) Trichlorofluoromethane (s)	EPA 601	ug/L ug/L	0.44		NEG	NEG	Pos	NEG	NEG	NEG	S S	NEG	NEG
	3	7	ر بر		9	GW.	2	2	2	Ð	9	9	9
Chloroform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	982	NEG
•	107	,	0.45		9	9	9	2	2	9	욧	2	9
Bramoform (f) Bramoform (s)	EPA 601	1/6n	0.45		NEG	N 65	NEG	S	NEG	NEG	NEG NEG	NEG	9 9 9

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			Detection	Fleid .	GW7-A	£ 7.	(H)	V-12	A-RWS	9	(A)	SW-RA	88
Parameter	Method	units	Limit	Site :	SEVEN	SEVEN	SEVEN	SEVEN	EI GHT	EI GHT	EB	EI GHT	EIGHT
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloromethane (f)	EPA 601	ug/L	0.49		9	9	2	2	9	9	9	9	9
Chloromathane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	SBN SBN	NEG	NEG	NEG
Hethylene Chloride (f)	EPA 601	ng/L	0,34		9	2.5	9	2	9	2.8	9	9	9
Methylene Chloride (s)	EPA 601	ng/L	0,34		NEG	POS	NEG	NEG	NEG	POS	NEG	NEG	NEG
Carbon Tetrachi oride (f)	EPA 601	ug/L	0.46		2	9	9	9	2	9	9	9	9
Carbon Tetrachloride (s)	EPA 601	ug/L	0.46		NEG	NEG	NEG	NEG	NEG	NBG	NEG	NEG	NEG
Branodichloramethane (f)	EPA 601	ug/L	0,35		9	9	9	9	9	9	Ş	2	9
Bramodichloramethane (s)	EPA 601	ug/L	0,35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibramochioramethane (f)	EPA 601	ug/L	0.31		9	2	9	2.9	9	9	9	9	9
Dibromochloromethane (s)	EPA 601	ug/L	0,31		NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG
Brancmethane (f)	EPA 601	ug/L	0.63		9	2	2	2	9	9	9	9	2
Bromomethane (s)	EPA 601	ng/L	0.63		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NE G
Dichlorodifluoromethane (f)	EPA 601	ug/L	0,33		2	9	₽	9	9	9	9	2	2
Dichlorodifluoromethane (s)	EPA 601	ng/L	0.33		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluorome thane (f)	EPA 601	ug/L	0.44		Ş	Q	9	9	2	1,2	9	2	9
Trichlorofluoromethane (s)	EPA 601	ng/L	0.44		NEG	NEG N	NEG	NEG	NEG	P.05	NEG	NEG	NEG
Chloroform (f)	EPA 601	ng/L	0.45		9	7.0	2	9	9	Q	9	9	2
Chloroform (s)	EPA 601	ug/L	0.45		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 601	ug/L	0.45		9	9	9	9	9	9	9	9	9
Bromoform (s)	EPA 601	ng/L	0.45		NEG	NEG	N EG	S N	NEG NEG	N EG	S	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEN ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

					TRIP	TR IP	TRIP	RINSF	
			Detection	Field #:	BLANK	BLANK	BLANK	BLANK	
Par aneter	Wethod	Units	Limit	Site :	FOUR	SEVEN	EI GHT	THREE	
Purgeable Halocarbons	EPA 601	1/6n	MDL						
Chloromethane (f)	EPA 601	ug/L	0,49		9	2	9	QN	
Chi orgaethane (s)	EPA 601	ng/r	0.49		NEG	NEG	NEG	MEG	
Methylene Chloride (f)	EPA 601	ug/L	0,34		9	9	9	35.	
Hethylene Chloride (s)	EPA 601	7g/	0,34		NEG	NEG	NEG	POS	
Carbon Tetrachloride (f)	EPA 601	ug/L	0,46		9	9	9	Q	
Carbon Tetrachloride (s)	EPA 601	ug/L	0.46		NEG	NEG	NEG	NEG	
Brampdichloramethane (f)	EPA 601	ug/L	0,35		9	9	2	1,5	
Brancdichloramethane (s)	EPA 601	ng/L	0,35		NEG	NEG	NEG	P0S	
Dibramochioramethane (f)	EPA 601	ug/L	0,31		9	2	9	₽	
Dibramochloramethane (s)	EPA 601	ng/r	0.31		NEG	NEG	NEG	NEG	
Brancmethane (f)	EPA 601	ug/L	0,63		9	9	2	Q	
Branamethene (s)	EPA 601	ng/r	0,63		NEG	NEG	NEG	NEG	
Dichlorodifluoromethane (f)	EPA 601	νgΛ	0,33		2	9	2	Q	
Dichlorodifluoromethane (s)	EPA 601	1/6n	0,33		NEG	NEG	NEG	NEG	
Trichlorofluoromethane (f)	EPA 601	ug/L	0.44		9	9	9	9	
Trichlorofluoromethane (s)	BPA 601	ng/r	0.44		NEG	NEG	NEG	NEG	
Chloroform (f)	EPA 601	ug/L	0.45		9	5.4	9	8*6	
Chloroform (s)	EPA 601	7/6n	0.45		NEG	POS	NEG	Pos	
Bramoform (f)	EPA 601	υgΛ	0.45		9	9	2	QN	
Branoform (s)	EPA 601	ng/L	0,45		NEG	NEG	NEG	NEG	

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"MD" indicates that the parameter was not detected.

DATACHBU AMALYTICAL REPORT Duluth IAP - Nater Samples Second Column Confirmations

			Detection	Field#:	GWI-A	3€1 -C	G-1 M5	GW1-E	A1-18	SW-1B	GW2-A	GW2-B	GW2-C
Par ame ter	Method	Units	Limit	Site :	ONE	ONE	ONE	ONE	ONE	ONE	OF	9	OMIL
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloroethane (f)	EPA 601	ug/L	0,38		9	2	Q	9	9	9	Q	9	9
Chloroethane (s)	EPA 601	ug/L	0° 38		NEG	NEG	NEG	NEG	NEG	NEG	¥ EC	9 9	NEG
1.1-Dichloroethane (f)	EPA 601	ng/r	0.49		2	9	£	2	ð	9	9	9	9
1,1-Dichloroethane (s)	EPA 601	ng/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	№ EG	NEG	NEG
1,2-Dichloroethane (+)	EPA 601	ug/L	0.44		2	2	9	9	9	9	9	9	9
1,2-Dichloroethane (s)	EPA 601	ng/L	0.44		NEG	NEG	NEG	NEG	N BG	NEG	N EG	99 99	NEG
1,1,1-Trichloroethane (f)	EPA 601	ug/L	0.53		2	9	⊋	2	2	2,9	9	9	9
1,1,1-Trichloroethane (s)	EPA 601	ng/L	0,53		NEG	NEG	NEG	NEG	NEG	POS	N BC	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 601	ng/r	0.51		9	2	9	9	9	2	9	2	9
1,1,2-Trichloroethane (s)	EPA 601	ng/L	0,51		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 601	ug/r	0,38		9	욮	g	9	9	2	9	9	2
1,1,2,2-*atrachloroethane (s)	EPA 601	ng/L	9%.0		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
Vinyl Chloride (+)	EPA 601	ug/L	0.54		2	9	9	2	Q	9	9	2	9
Vinyi Chloride (s)	EPA 601	√lon	0,54		NEG	NEG	NEG	NEG	NEG	NEG	NBC	N BC	NEG
1,1-Dichloroethene (f)	EPA 601	ug/r	0.49		9	9	2	9	9	2	9	9	2
1, 1-Dichloroethene (s)	EPA 601	ng/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	99 N	N EG	NEG
trans-1,2-Dichloroethene (+)	EPA 601	ng/L	0.42		2	9	9	2	9	9	9	9	2
trans-1,2-Dichloroethene (s)	EPA 601	ng/L	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N BG	NEG
Trichloroethene (f)	EPA 501	ng/r	0,60		9	9	2	9	9	9	윤	9	9
Trichloroethene (s)	EPA 601	ng/L	09*0		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM MALYTICAL REPORT Dujuth IAP - Water Samples Second Column Confirmations

Par amater	Method	units	Detection	Field #: Site :	GW2-D TWO	GW2-E TWO	SM-2A TWO	SW-2B TWO	SW-2C TWO	TWO	MM-2 TWO	TWO	TWO
Purgeable Halocarbons	EPA 601	ug/L	MDF									!	9
Chloroethane (t)	EPA 603	ng/r	0,38		9	2	Ş	9 !	9 9	9 {	9 9	9 §	2 4
Chloroethane (s)	EPA 601	ng/L	0, 38		NEC	NEG	SE NEC	NEG N	N EG	2 2	2	3	
;		3	0		Ş	9	2	2	£	2	2	9	2
1,1-Dichioroethane (f) 1,1-Dichioroethane (s)	EPA 601	1/6n	0.49		. S	NEG	NEG	NEG	NEG	NEG	88 88	NEG	NEG
		Í	•		ź	Ŝ	9	9	2	2	9	9	2
),2-Dichloroethane (f)	EPA 601	1/6n 19/L	0.44		N EG	NEG NEG	NEG	NEG	NEG	NEG	NEG	98	NEG
			5		Ş	4	æ	9	2	2	2	2	2
1,1,1-Trichloroethane (+)	EPA 601 EPA 601	1/6n 18/L	0,53		NEG E	NEG	NEG	NEG	N EG	NEG	S S S S S S S S S S S S S S S S S S S	99 N	NEG
		;			Ş	Ş	Ş	9	2	2	9	2	2
1,1,2-Trichloroethane (f) 1,1,2-Trichloroethane (s)	EPA 601 EPA 601	ug/L ug/L	0.51		S S	NEG	NEG	NEG	NEG	NEG	NEG	88 88	NEG
			;		ç	Ş	Ş	9	g	9	2	2	2
1,1,2,2-Tetrachloroethane (f) 1,1,2,2-Tetrachloroethane (s)	EPA 601 EPA 601	ug/L ug/L	0,38		9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	NEG E	NEG	NEG .	NEG	NEG	NEG	SBN SBN	NEG
		•	4		9	Ş	£	2	2	9	9	9	9
Vinyl Chloride (f) Vinyl Chloride (s)	EPA 601	1/gn ng/t	0,54		S S	SEC	NEG	NEG	NEG	NEG	NEG	N BG	NEG
:	Š	1,011	0		Ş	9	2	9	9	9	9	2	9
1,1-Dichloroethene (†) 1,1-Dichloroethene (s)	EPA 601	ug/L	0.49		NEG TE	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG.
	104 601	9	0.42		13.	.99	2	2	2.6	2.3	ð	2	9
trans-1,2-Dichloroethene (1)	EPA 601	7/6n	0.42		POS	POS	93N	NEG	POS	POS	NEG	NEG NEG	NEG N
	3	7	0		9	20.	9	9	2	9	9	9	2
Trichloroethene (f) Trichloroethene (s)	EPA 601	09/L 09/L	0.60		98	Pos	NEG	NEG	NEG	NEG	NEG	98 x	NEG.

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DATACHEM MALLYFICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

Por anoter	Method	Units	Defection	Fleid#: Site :	OMT OMT	MW-7	GW3-A THREE	GW3-B THREE	GW3-C THREE	GM3-D THREE	SM-3A THREE	SM-38 THREE	SM-3C THREE
Purgeable Halocarbons	EPA 601	ng/L	MDL										
Chloroethane (f)	EPA 601	ng/L	0,38		9	Q	2	9	9	0,70	9	Ş	Ş
Chloroethane (s)	EPA 601	1/6n	0.38		NEG	NEG	NEG	NEG	NEG	Pos	NEG	N RBG	NEG
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		Đ	Ð	9	310	83.	97.	8.9	36.	37.
1,1-Dichloroethane (s)	EPA 601	√g'n	0.49		NEG	NEG	NEG	POS	POS	POS	POS	POS	Pos
1,2-Dichloroethene (f)	EPA 601	J/gv	0.44		2	2	9	4.7	9	1.9	2	3.0	2.8
1,2-Dichloroethane (s)	EPA 601	√gn	0.44		99 N	NEG	NEG	POS	NEG	POS	NEG	POS	POS
1,1,1-Trichloroethane (f)	EPA 601	ug/L	0,53		2	2	9	1900	83.	1400	25.	1400	970
1,1,1-Trichloroethane (s)	EPA 601	ug/L	0,53		NEG	NEG	NEG	POS	РОЅ	POS	P0S	POS	POS
1,1,2-Trichl proethane (f)	EPA 601	ng/L	0.51		9	Ð	9	2	9	9	9	2	9
1,1,2-Trichioroethane (s)	EPA 601	ng/L	0,51		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Te trach! or oe thane (f)	EPA 601	ug/L	0,38		9	Q	Q	2	2	9	2	2	2
1,1,2,2-Tetrachioroethane (s)	EPA 601	1/6n	o. 38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 601	ug/L	0.54		9	9	9	9	9	9.1	0.9	4.8	3.0
Vinyl Chloride (s)	EPA 601	ug/L	0.54		NEG	NEG	NEG	NEG	NEG	Pos	POS	POS	POS
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		2	Q	9	30.	69*0	47.	5.7	35.	26.
1,1-Dichloroethene (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	POS	Pos	POS	POS	Pos	POS
trans-1,2-Dichloroethene (f)	EPA 601	ug/L	0.42		⊋	2	9	35.	260	.89	82.	.07	55.
trans-1,2-Dichloroethene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	POS	POS	POS	Pos	SQ.	Pos
Trichloroethene (f)	EPA 601	J/gv	09*0		2	9	9	4.4	31.	4.4	740	570	350
Trichloroethene (s)	EPA 601	76n	09*0		NEG	NEG	NEG	\$	Pos	SO.	SS S	SQ.	S S

DATACHER ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

			Detection	Field #:	GW4-A	GW4-B	GW4-C	GW4-D	SW-4A	SW-4B	SE-4 C	G 4− ¥2	8 -₩
Per aneter	Method	Units	Limit	Site :	FOUR	FOUR	FOUR						
Purgeable Helocarbons	EPA 601	ug/L	Ą										
Chloroethane (f)	EPA 601	ug/L	0,38		2	2	2	2	9	9	9	2	9
Chloroethane (s)	EPA 601	ng/L	98.0		NEG	N EG	NEG						
1,1-Dichi proethane (f)	EPA 601	ng/L	0.49		⊋	9	Ş	9	9	9	9	2	9
1, 1-Dichloroethane (s)	EPA 601	ng/L	0.49		NEG	N EG	NEG						
1,2-Dichloroethane (f)	EPA 601	J/gn	0.44		2	2	9	9	9	2	9	9	2
1,2-Dichloroethane (s)	EPA 601	ηgη	0.44		NEG	NEG	NEG						
1,1,1-Trichloroethane (f)	EPA 601	ug/t	0.53		2	Q	9	9	9	9	.61	.01	Q
1, 1, 1-Trichloroethane (s)	EPA 601	ng/L	0,53		NEG	NEG	NEG	NEG	NEG	NEG	Pos	POS	NEG
1,1,2-Trichl proethane (f)	EPA 601	ng/L	0.51		9	9	9	9	Q	9	9	2	9
1, 1,2-Trichloroethane (s)	EPA 601	ng/L	0.51		NEG	NEG	NEG	NEG	NEG	NEG	9 8	N BG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 601	ug/L	0.38		9	9	2	9	9	9	9	2	2
1,1,2,2-Tetrachloroethane (s)	EPA 601	$\nu_{\rm g}$	0.38		NEG	NEG	NEG						
Vinyt Chloride (f)	EPA 601	ug/L	0.54		9	9	2	2	Ş	2	Q	2	2
Vinyi Chloride (s)	EPA 601	ug/L	0,54		NEG	NEG	NEG						
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		9	2	2	9	9	9	9	9	9
1,1-Dichloroethene (s)	EPA 601	ng/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	S K	N EC	NEG
trans-1,2-Dichloroethene (f)	EPA 601	ug/L	0.42		2	Ð	Q	2	9	0.4	4.4	2,2	Q
trans-1,2-Dichloroethene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG	NEG	SOS.	Pos	POS	NEG
Trichloroethene (f)	EPA 601	ng/L	0.60		9	2	2	2	9	22.	16.	9.6	9
Trichloroethene (s)	EPA 601	ng/L	09*0		NEG	NEG	NEG	NEG	NEG	POS	Pos	POS	NEG

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DATACHEM ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

			Detection	Field#:	6-MW	MM-10	MM-11	GW5-A	GW5-B	GWS-C	SE-5A	SW-5B	SM-5C
Por ane ter	Mathod	Units	Limit	Site :	FOUR	FOUR	FOUR	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE
Purgeable Helocarbons	EPA 601	ug/L	MOL										
Chloroethane (f)	EPA 601	ug/L	0,38		9	₽	2	9	9	9	9	9	9
Chloroethane (s)	EPA 601	ng/L	0.38		NEG	NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG
1,1-Dichioroethane (f)	EPA 601	ug/L	0.49		9	9	9	9	9	Ð	ð	9	9
1,1-Dichloroethane (s)	EPA 601	ug/L	0.49		NEG	NEG	N EG	NEG	NEG	NEG	NEG	N BC	NEG
1,2-Dichloroethene (f)	EPA 601	ng/r	0.44		9	9	9	9	9	2	9	2	9
1,2-Dichloroethane (s)	EPA 601	ng/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
1,1,1-Trichloroethane (f)	EPA 601	ug/L	0,53		Ð	9	9	9	9	9	2	9	2
1,1,1-Trichloroethane (s)	EPA 601	ug/L	0,53		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichi oroethane (f)	EPA 601	ug/L	0.51		2	9	ð	9	9	9	2	9	9
1,1,2-Trichloroethane (s)	EPA 601	ng/L	0.51		NEG	NEG	NEG	N EG	N EG	NEG	N BG	NEG	NEG
1,1,2,2-Tetrachloroethane (1)	EPA 601	ug/L	0,38		9	9	2	9	9	9	2	9	2
1,1,2,2-Tetrachloroethane (s)	EPA 601	ng/L	0,38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 601	ug/L	0.54		2	9	9	9	Q	9	9	9	9
Vinyi Chloride (s)	EPA 601	ng/L	0.54		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		9	2	9	9	9	9	9	9	9
1, 1-Dichloroethene (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 601	ng/L	0.42		2	5.8	2	9	9	9	2	Q	Ş
trans-1,2-Dichloroethene (s)	EPA 601	ng/L	0.42		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (+)	EPA 601	ng/L	09*0		9	9	Q	9	9	9	9	9	9
Trichloroethene (s)	EPA 601	ng/L	09*0		NEG	NEG	NEG	N EG	NEG	SE	98 88	NEG	NEG

DATACHEN ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

Parameter	Met hod	units	Detection	Field#: Site :	GM7-A SEVEN	SEVEN SEVEN	GW7 -C SEVEN	SM-7A SEVEN	GW8-A E1GHT	GW8-B E1GHT	GWB -C EI GHT	SW-8A E1 GHT	S#-88 E1 GHT
Purgeable Halocarbons	EPA 601	1/6n	MOL										!
Chloroethene (f)	EPA 601	ug/L	0,38		S S	NEG N	NEG E	NEG NEG	NEG NEG	N EG	Q 9	9 9	NEG NE
Chloroername (s) 1,1-Dichioroethane (t) 1,1-Dichioroethane (s)	EPA 601	1/6n 100/r	0.49		NEG NO	NEG	9 S	ND NEG	N S S	NEG NEG	2 × 0	NEG NO	NE G
1,2-Dichioroethane (f)	EPA 601 EPA 601	ug/L ug/L	0.44		NEG PO	0.82 P0S	ND NEG	0.83 POS	NEG NE	N EG	N EG	S &	N NEG
1,1,1-Trichioroethane (f)	EPA 601 EPA 601	ug/L ug/L	0.55		NEG NEG	N EG	NEG NEG	ND	N EG	N EG	ð ä	7	NEG NEG
1,1,2-Trichloroethane (f)	EPA 601 EPA 601	ug/L ug/L	0,51		NEG PO	S & S	N EG	N EG	2 9	N N N N N N N N N N N N N N N N N N N	NEG NG	S S S	NEG NO
1,1,2,2-Tetrachi oroethane (f) 1,1,2,2-Tetrachi oroethane (s)	EPA 601 EPA 601	ug/L ug/L	0,38		N NEG	N EG	NO NEG	ND NEG	9 g	NEG NO	NEG NO	NEG N	Q 9
Vinyl Chloride (f) Vinyl Chloride (s)	EPA 601 EPA 601	ug/L ug/L	0.54		N NEG	N PO	N EG	N EG	NEG 70	N G	NEG N	NEG N	NEG NO
1,1-Dichloroethene (t) 1,1-Dichloroethene (s)	EPA 601 EPA 601	ug/L ug/L	0.49		NEG NEG	NEG TO	9 9 9 9 9	NEG NEG	NEG &	N NEG	NEG NEG	N SS	NEG PO
trans-1,2-Dichioroethene (f) trans-1,2-Dichloroethene (s)	EPA 601 EPA 601	υg/L υg/L	0.42		NEG NEG	N P P	NEG NEG	7.2 POS	N K	S & G	N N N N N N N N N N N N N N N N N N N	9 SB	NEG NEG
Trichloroethene (†) Trichloroethene (\$)	EPA 601	ug/L ug/L	09*0		ND NEG	220 P05	1.1 Pos	5.1 POS	ND NEG	NEG NG	Se 6	S S	ND NEG

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"ND" indicates that the parameter was not detected.

DATACHEN ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

					51 07	141	TRIP	RINSE	
				4	1 6	NA EL	HI ANK	BLANK	
			De tection	<u>.</u>	BLANK BLANK	DEATH.	בייניייייי	THREE	
Parameter	Method	Units	- Imi	Si te	YOU'	SCVEN	5		
Superior Hall and Assessment	EPA 601	ug/L	MOF						
	CPA 601	ua/L	0,38		2	9	2	QN S	
Chioroethane (1)	EPA 601	1/6n	0.38		NEG	NEG	NEG.	Ή	
		4	0		2	2	9	æ	
1,1-Dichloroethane (f)	EPA 601 EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	
	•	Ş	7		2	9	9	æ	
1,2-Dichloroethane (f)	EPA 601 EPA 601	ug/r	0.44		NEG	NEG	NEG	NEG	
	;	•			9	2	2	S	
1,1,1-Trichioroethane (f)	EPA 601 EPA 601	ng/r	0.53		NEG	NEG	NEG	NEG	
	:		ď		9	5	9	Q	
1,1,2-Trichloroethane (f)	EPA 601 EPA 601	1/6n 1/6n	0.51		NEG	NEG	NEG	NEG	
			1		Ş	9	2	Q	
1,1,2,2-Tetrachloroethane (f)	EPA 601	ug/L	æ º		2 <u>7</u>	Ä.	NEG	NEG	
1,1,2,2-Tetrachi oroethane (s)	EPA 601	1/6n	0.58)				
			A.		2	2	2	욧	
vinyi Chloride (f) vinyi Chloride (s)	EPA 601	ug/r	0.54		NEG	NEG	N EG	NEG	
		70:	07 0		2	5	2	Q.	
1,1-Dichloroethene (f)	EPA 601	ug/L ug/L	0.49		NEG	NEG	NEG	NEG	
		V - ::	0.40		9	2	9	9	
trans-1,2-Dichloroethene (f) trans-1,2-Dichloroethene (s)	EPA 601	ug/L			NEG	NEG	NEG	NEG	
	104	701	0,60		2	2	2	Ş	
Trichloroethene (f) Trichloroethene (s)	EPA 601				NEG	NEG	NEG	NEG	

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DATACHEM AMALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

Par anoter	Method	Units	Defection	Field #: Site :	GW1-A	GW1-C	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C
Purgeable Halocarbons	EPA 601	ng/L	MDL						ı	!	Ş	Š	ç
to the act of occupants (f)	FPA 601	ua/L	0,38		9	2	2	9	9	2	2	2	⊋ 9
Te trachloroethene (s)	EPA 601	ng/L	0.38		NEG	NEG	NEG	NEG N	NEG	NEG	S E E	99	
;	, (7	0.00		Ş	£	9	9	9	₽	9	9	2
1,2-Dichloropropane (†) 1,2-Dichloropropane (s)	EPA 601	ug/L	0.20		NEG E	NEG	NEG	NEG	NEG	NEG	SB	NEG	NEG
	,	7	9		Ş	Ş	9	9	2	2	9	9	9
cis-1,3-Dichloraprapene (f) cis-1,3-Dichloraprapene (s)	EPA 601	ug/L ug/L	0.58		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
	Š	,	02.0		Ş	Ş	9	2	2	2	2	9	2
<pre>trans-1,3-Dichioropropene (f) trans-1,3-Dichloropropene (s)</pre>	EPA 601	ug/r ug/r	0.39		NEG E	NEG	N EG	NEG	NEG	NEG	NEG	NEG	NEG
	,		;		Ş	5	9	2	9	2	2	9	2
2-Chloroethylvinyl Ether (f) 2-Chloroethylvinyl Ether (s)	EPA 601	ng/r ng/r	0.44		NEG E	NEG	NEG NEG	NEG	NEG	NEG	N BC	N EG	NEG
		;	;		Ş	Ş	Ę	2	2	2	9	9	æ
Chlorobenzene (f)	EPA 601	ug/L ug/L	0.57		NEG E	NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG
	į	3	ć		Ş	Ź	9	9	2	2	2	9	9
<pre>1,2-01ch1 orobenzene (*) 1,2-01ch1orobenzene (s)</pre>	EPA 601	ug/L	62°0		NEG 6	NEG	NEG	NEG	NEG	NEG	NEG	SB SB	NEG
		7	2		Ş	Q	9	9	9	9	2	9	2
1,3-0ichiorobenzene (f) 1,3-0ichlorobenzene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
	104 401	, <u>c</u>	14.0		2	3	Q	9	9	9	9	9	9
1,4-Dichlorobenzene (T) 1,4-Dichlorobenzene (S)	EPA 601	ug/L	0.41		NEG	NEG	NEG	NEG	NEG	NEG	NEG N	NEG NEG	S N

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DATACHEM MARLYFICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	units	Detection Limit	Field #: Site :	GW2-D TW0	GW2-E TWO	SW-2A TWO	SW-28 TWO	SW-2C	NW-1	MM-2	MM-4	MM-5 TWO
Purgeable Halocarbons	EPA 601	ng/L	MOL										
Tetrachloroethene (+)	EPA 601	ug/L	0,38		9	Q	2	Ð	Q	Q	2	2	9
Tetrachloroethene (s)	EPA 601	ŋ∂/L	98.*0		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 601	ug/L	0,20		9	9	9	9	ş	9	9	2	9
1,2-Dichloropropane (s)	EPA 601	ng/L	0.20		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 601	1/6n	0.58		2	9	ð	9	9	9	9	2	9
cis-1,3-Dichloropropene (s)	EPA 601	ng/L	0,58		NEG	NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG
trans-1,3-Dichloropropene (f)	EPA 601	ug/L	0,39		2	9	9	9	9	9	9	9	9
trans-1,3-Dichloropropene (s)	EPA 601	7/6n	0,39		NEG	NEG	NEG	NEG	NEG	NEG	N BG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 601	ug/L	0.44		9	9	9	9	9	9	9	9	9
2-Chloroethylvinyl Ether (s)	EPA 601	ng/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 601	ng/r	0,37		2	2	9	9	2	9	9	2	9
Chiorobenzene (s)	EPA 601	√gn	0,37		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 601	J/gn	0,29		9	9	9	9	9	9	2	Q	9
1,2-Dichiorobenzene (s)	EPA 601	√gn	0,29		NEG	NEG	NEG	NEG	N BG	NEG	N EG	N EG	NEG
1,3-Dichlorobenzene (f)	EPA 601	J/gu	0,42		9	2	Ð	9	Q	9	9	9	9
1, 3-Dichlorobenzene (s)	EPA 601	√gn	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 601	ng/L	0.41		2	9	2	9	2	9	9	9	9
1,4-Dichlorobenzene (s)	EPA 601	ug/L	0.41		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

DATACHBA ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

Par ame ter	Method	Units	Detection	Field#: Site :	9-ME	T-MM-7	GW3-A THREE	GW3-B THREE	GM3-C THREE	GW3-D THREE	SM-3A THREE	SM-38 THREE	SM-3C THREE
Purgeable Helocarbons Tetrachloroethene (f)	EPA 601 EPA 601	1/6n 1/6n	MUL 0,38 0,38		NEG NEG	NEG NEG	NEG NEG	490 P0S	430 Pos	1000 Pos	10. Pos	10. POS	8.1 POS
Tetrachioroethene (s) 1,2-Dichloropropane (f)	EPA 601	ug/L ug/L	0.20		NEG NEG	NEG NEG	N EG	NEG NEG	ND NEG	NEG Z	S S	ð S	NEG NO
cis-1,3-Dichloropropene (f)	EPA 601 EPA 601	ug/L ug/L	0,58		ND NEG	G G	ND NEG	NEG PG	NEG NE	NEG NEG	Q 99 N	N GG	NEG.
trans-1,3-Dichloropropene (†)	EPA 601 EPA 601	ug/L ug/L	0.39		NEG NE	ND	ND	ND NEG	ND NEG	9 S	N NEG	9 9 <u>2</u>	NE G
2-Chloroethylvinyl Ether (f)	EPA 601 EPA 601	ug/L ug/L	0.44		NEG N	NEG NEG	N NO NEG	NEG N	N P	ð 8	S S	Q 99	NEG N
Chlorobenzene (f)	EPA 601 EPA 601	ug/t ug/L	0.37		NEG 75	NO NEG	NEG NEG	ND NEG	NEG NEG	NEG NEG	N KB	N KEG	S KEG
1,2-Dichlorobenzene (f)	EPA 601 EPA 601	ug/t ug/t	0.29		NO NEG	NEG NEG	NEG NEG	ND	NEG NEG	N EG		3	NEG NEG
1,3-Dichiorobenzene (f)	EPA 601 EPA 601	ng/L ug/L	0.42 0.42		NEG NEG	NEG NEG	CN SH	NEG NEG	N EG	S S S	2 2 2	2 8 2	2 9 2
1,4-Dichlorobenzene (f)	EPA υ31 EPA 601	7/Bn	0.41		N EG	NEG NEG	NEG NE	G NEG	NEG	NEG	99 99 99	99	NEG

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"My" indicates that the parameter was not detected.

DATACHER AMALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

			Detection	Field#:	GW4-A	GW4-B	GW4-C	GW4-D	SW-4A	SW-4B	SW-4C	SE-40	MM-8
Par aneter	Method	Units	Limit	Site :	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FULR	FOUR	FOUR
Purgeable Halocarbons	EPA 601	ng/L	MDL										
Tetrachloroethene (+)	EPA 601	ug/L	0,38		9	9	9	9	9	9	S	9	9
Tetrachloroethene (s)	EPA 601	ng∕L	9.38		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NBG SB	NEG
1,2-Dichloropropane (f)	EPA 601	J/gv	0,20		9	2	2	9	2	9	9	ð	2
1,2-Dichloropropane (s)	EPA 601	ng/L	0,20		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cls-1,3-Dichloropropene (f)	EPA 601	ug/L	0.58		9	9	2	2	2	2	9	2	9
cis-1,3-Dichloropropene (s)	EPA 601	ηgγ	0,58		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NE G
trans-1,3-Dichloropropene (f)	EPA 601	J/gu	0,39		2	9	ð	9	9	2	9	2	Ð
trans-1,3-Dichloropropene (s)	EPA 601	ng/L	0,39		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 601	1/6n	0.44		2	2	2	2	₽	2	9	2	9
2-Chloroethylvinyl Ether (s)	EPA 601	J/Gn	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 601	ug/t	0.37		9	g	9	2	9	0.98	2.2	2	9
Chlorobenzene (s)	EPA 601	ng/r	0,37		NEG	NEG	NEG	NEG	NEG	P.05	Pos	N BG	NEG
1,2-Dichlorobenzene (f)	EPA 601	ug/L	0,29		2	9	2	2	9	9	9	9	2
1,2-Dichlorobenzene (s)	EPA 601	ug/L	6 2° 0		NEG	NEG	NEG	NEG	NEG	NEG	N EG	N BC	NE G
1,3-Dichiorobenzene (f)	EPA 601	ng/L	0.42		9	9	9	9	9	2	9	2	Ş
1, J-Dichlorobenzene (s)	EPA 601	ng/L	0.42		NEG	NEG	NEG	NEG	NEG	ve6	S S	NEG N	NEG
1,4-Dichlorobenzene (f)	EPA 601	1/bn	0.41		2	9	2	2	9	9	9	9	9
1,4-Dichlorobenzene (s)	EPA 601	ug/L	0.41		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N BB	NEG

DATACHEN MALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

Par amoter	Method	Units	Detection Limit	Fleid #: Site :	MM-9 FOUR	FOUR	FOUR	GN5-A FIVE	GW5-8 F.1 VE	GW5-C F I VE	SW-5A FIVE	SW-58 FIVE	SM-5C FIVE
Purgeable Helocarbons	EPA 601	1/gn	MDL 0.38		身	2	9	9	9	9	Q S	ð	Ö Ü
Tetrachloroethene (f) Tetrachloroethene (s)	EPA 601	ug/L	88.0		NEG	NEG	NEG	NEG	NEG	9 9 8	2	Š	
	;	5	900		9	9	9	9	9	9	2	9	9 §
1,2-Dichloropropane (f)	EPA 601	1/6n 1/6v	0.20		NEG	NEG	NEG	NEG NEG	NEG NEG	NEG	9 2	9 8	9 9 8
			ć		Ş	9	2	ð	9	9	9	9	9
cis-1,3-Dichloropropene (f)	EPA 601 EPA 601	ug/L ug/L	0.58		NEG E	NEG	NEG	NEG	NEG	NEG	NEG P	N 66	NEG
					ç	9	S	9	9	2	2	9	9
trans-1,3-Dichloropropene (f)	EPA 601 EPA 601	ug/r ug/r	0,39 0,39		2 9g	N SE	NEG	NEG	NEG	NEG	NEG	8	NE G
						Ś	9	ş	Ş	9	2	2	9
2-Chloroethylvinyl Ether (f)	EPA 601	ug/L ug/L	0.44		NE C	NEG A	N SE	S S	NEG	NEG	NEG	NEG	NEG
כיינוס פרויא ואין אין אין אין אין אין אין אין אין אין					<u> </u>	ç	Ş	£	9	2	9	2	2
Chlorobenzene (f)	EPA 601 EPA 601	ug/r ug/r	0.37		NEG &	NEG	NEG S	NEG	NEG	NEG	N EG	NEG	NEG
					Ş	ç	Ş	2	2	9	9	2	2
1,2-Dichlorobenzene (f)	EPA 601 EPA 601	ug/L ug/L	0 <u>.29</u> 0 <u>.29</u>		S 8	S S	99	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobandana (5)	:	,				Ś	9	Ş	Ş	9	2	2	9
1,3-Dichlorobenzene (f)	EPA 601	ug/L ug/L	0.42		NEG NO	NEG 25	NEG E	N ES	NEC	NBS	NEG	N BG	NEG
		ı	,		ç	Ş	9	9	2	9	QN	2	2
1,4-Dichlorobenzene (f) 1,4-Dichlorobenzene (s)	EPA 601 EPA 601	1/6n 16V	0.41		NE S	NEG	NEG NEG	NEG N	NEG	NEG	NEG	NEG NEG	NEG

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

			Datection	Field #:	G-7-A	G#7	£7.45	AY-WS	GW8-A	G#8+B	S#8	SW-8A	SW-88
Par ameter	Method	st in	Limit	Site :	SEVEN	SEVEN	SEVEN	SEVEN	EI GHT	E I GHT	EI GHT	E1 GHT	ELONT
Purgeable Halocarbons	EPA 601	ng/r	MOL										
Tetrachi oroethene (f)	EPA 601	7/Bn	0,38		Ð	æ	9	7.6	9	9	5	9	9
Tetrachloroethene (s)	EPA 601	ng/L	0,38		NEG	NEG	NEG	Pos	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (†)	EPA 601	ug/L	0.20		2	Ş	2	9	9	2	Q	2	9
1,2-Dichloropropane (s)	EPA 601	ug/L	0,20		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 601	η/δη	0,58		9	9	9	9	9	Q	2	9	9
cis-1,3-Dichloropropene (s)	EPA 601	ng/L	0,58		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N BS	NEG
trans-1,3-Dichloropropene (f)	EPA 601	ng/r	0,39		9	9	2	2	9	9	9	ð	Ð
trans-1,3-Dichloropropene (s)	EPA 601	ug/L	0,39		NEG	NEG	N EG	NEG	NEG	NEG	99 99	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 601	ug/L	0.44		9	Ş	ð	Ð	2	9	9	2	9
2-Chloroethylvinyl Ether (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	N BS	NEG	NEG
Chlorobenzene (f)	EPA 601	7/bn	0.37		2	9	9	9	9	9	9	9	9
Chlorobenzene (s)	EPA 601	√gn	0.57		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
1,2-Dichlorobenzene (†)	EPA 601	ug/L	0.29		9	Ž	9	Q	2	9	9	Ð	9
1,2-Dichlorobenzene (s)	EPA 601	ng/L	0,29		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N BG	NE G
1,3-Dichiorobenzene (f)	EPA 601	ng/L	0.42		9	9	Ð	9	9	2	9	2	9
1,3-Dichlorobenzene (s)	EPA 601	ng/L	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG NEG	NEG S	NEG
1,4-Dichiorobenzene (f)	EPA 601	√L Mg/L	0.41		æ	9	9	9	2	2	9	9	9
1,4-Dichlorobenzane (s)	EPA 601	ng/L	0.41		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NE G

DATACHER ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

			•	• • •	TRIP	TR IP BLANK	TRIP	RI NSE BLANK
Parameter	Method	units	Detection	Site :	FOUR	SEVEN	EIGH	THEE
purceable Helocarbons	EPA 601	ug/L	MOL			4	Ş	0.52
Tetrachlorosthene (f)	EPA 601 EPA 601	ng/r	0.38 0.38		G	NEG.	NEG	POS
		•	ć		2	2	2	GN
1,2-Dichloropropane (f)	EPA 601 EPA 601	1/6n 1/6n	02.0		NEG	NEG	NEG	NEG
			9		2	5	2	Q.
cis-1,3-Dichloropropene (f)	EPA 601 EPA 601	1/6n 19/1	0.58		NEG	NEG	NEG	NEG
					5	9	9	QN
trans-1,3-Dichloropropene (f)	EPA 601 EPA 601	1/gn 1/g	0,39		NEG	NEG	NEG	NEG
					9	9	9	웃
2-Chioroethylvinyl Ether (f)	EPA 601 EPA 601	1/6n Ng/r	0.44		NEG P	NEG	NEG	NEG
2-chi or oediny i viny					Ş	2	9	9
Chlorobenzene (†)	EPA 601 EPA 601	ug/L ug/L	0,37		NEG &	NEG	NEG	NEG
Chi orobenzene (5)					5	2	2	Ş.
1,2-Dichlorobenzene (†)	EPA 601 EPA 601	1/6n 1/6n	0,29		NEG	NEG	NEG	NEG
1,2-Dieniorocenterio					9	2	2	웃
1,3-Dichlorobenzene (f)	EPA 601 EPA 601	7/6n 1/6n	0.42		NEG	NEG	NEG	NEG
					9	9	9	오
1,4-Dichlorobenzene (f) 1,4-Dichlorobenzene (s)	EPA 601 EPA 601	7 gm = 1	0.43		MEG	NEG	NEG	NEG

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WAD indicates that the parameter was not detected.

Duluth IAP - Water Samples Second Column Confirmations

			Detection	Field #:	Q#1-A	GW1-C	0-135	GW 1-E	¥1-18	91-18	GW2-A	GW2-B	G#2-C
Parameter	Method	Units	Limit	Site :	ONE	ONE	ONE	ONE	ONE	ONE	OF.	OM	OML
Purgeable Aromatics	EPA 602	√J/bn	MOL										
Benzene (†)	EPA 602	ug/L	0,25		9	9	9	2	9	2	9	2	2
Benzene (s)	EPA 602	ug/L	0,25		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 602	ug/L	0.64		9	9	9	9	9	9	2	9	9
Tolumne (s)	EPA 602	ug/L	0.64		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	MEG.
Ethyl benzene (f)	EPA 602	ng/r	0.75		9	9	9	9	2	9	2	9	Ð
Ethylbenzene (s)	EPA 602	ng/L	0,75		NEG	NEG	N EG	NEG	NEG	NEG	NEG	NBC	NEG
o-Xylene (f)	EPA 602	ug/L	0.78		9	9	9	9	9	9	9	9	9
o-Xylene (s)	EPA 602	ng/L	0,78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
m-Xylene (f)	EPA 602	ug/L	0.45		9	9	9	Ş	2	9	2	2	9
m-Xylene (s)	EPA 602	ng/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
p-Xylene (†)	EPA 602	ng/L	0.78		9	9	9	9	9	9	2	9	9
p-Xylene (s)	EFA 602	ng/L	0.78		NEG	NEG	N EG	NEG	NEG	NEG	NEG	N EG	NEG
Chlorobenzene (f)	EPA 602	ug/t	0,35		9	2	9	2	9	2	2	2	9
Chlorobenzene (s)	EPA 602	ng/L	0,35		NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	ug/L	0.47		9	9	Q	9	9	2	9	9	9
1,1-Dichlorobenzene (s)	EPA 602	ng/L	0.47		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 602	ug/L	0,93		Ð	9	9	9	9	9	2	2	9
1,2-Dichlorobenzene (s)	EPA 602	ng/L	0,93		99 99	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichiorobenzene (f)	EPA 602	ug/L	0.44		9	9	9	9	9	9	2	9	9
1,3-Dichiorobenzene (s)	EPA 602	7/6n	0.44		NEG	N EG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples
Second Column Confirmations

			Detection	Field #:	GW2-D	GW2-E	SW-ZA	SW-2B	SW-2C	MM-1	MM-2	AW-4	MW-5
Parameter	Method	Units	Limit	Site :	TWO	TWO	D. T.	OML OML	OML	JWD	OPL	OML.	OML
Purgeable Arcmatics (cont.)	EPA 602	ug/L	M OF										
Benzene (†)	EPA 602	ug/L	0,25		9	æ	9	9	2	9	9	9	9
Benzene (s)	EPA 602	ng/L	0,25		NEG	NEG	NEG	NEG	NEG	NEG	N BG	N EG	NEG
Toluene (f)	EPA 602	ug/L	0.64		9	9	9	9	9	2	9	€	₽
Toluene (s)	EPA 602	√Jon	0.64		NEG	NEG	NEG	N EG	NEG	NEG	NEG	N EG	NEG
Ethyl benzene (f)	EPA 602	ng/L	0.75		9	9	9	9	9	9	9	9	9
Ethylben zane (s)	EPA 602	ug/L	0.75		NEG	NEG	NEG	NEG	N EG	NEG	N EG	N EG	NEG
o-Xylene (†)	EPA 602	ug/L	0.78		2	Ĵ	9	2	9	9	9	9	9
o-Xylene (s)	EPA 602	ng/L	0,78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
m-Xylene (f)	EPA 602	ng/L	0.45		2	Ş	9	9	9	2	9	9	2
m-Xylene (s)	EPA 602	ng/L	0,45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N BBC	NEG
p-Xylene (†)	EPA 602	ug/L	0.78		9	9	9	9	9	9	9	9	Ð
p-Xylene (s)	EPA 602	J/6n	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 602	ug/L	0,35		2	9	9	9	9	Q	2	9	9
Chlorobenzene (s)	EPA 602	ug/L	0,35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	ng/L	0.47		2	2	9	9	9	9	9	9	9
1,1-Dichlorobenzene (s)	EPA 602	√gn	0.47		NEG	NEG	NEG	NEG	NEG	NEG	NEG	98 N	NEG
1,2-Dichlorobenzene (f)	EPA 602	ug/i	95		3	9	9	9	9	2	9	2	9
1,2-Dichlorobenzene (s)	EPA 602	√gn	0.93		NEG	NEG	NEG	NEG	NEG	NEG	NEG	SBN	NEG
1,3-Dichlorobenzene (†)	EPA 602	1/6n	0.44		2	Ð	2	9	2	9	2	2	9
1, 3-Dichlorobenzene (s)	EPA 602	√gn	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

DATACHEM AMALYTICAL REPORT
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			Detection	Field #:	M -0	V-7	GW3-A	GW3-B	3-C	GW3-0	SW-3A	54-38	. <u>9</u> -3C
Perameter	Method	Units	Limit	Site :	DWC	JWD	THREE						
Purgeable Archatics (cont.)	EPA 602	ug/L	MDL										
Benzene (f)	EPA 602	ug/L	0.25		Ð	€	2	2	2	2	3	Ð	2
Benzene (s)	EPA 602	ug/L	0,25		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 602	ug/L	0.64		2	9	9	36.	2	9	2	2	9
Toluene (s)	EPA 602	ng/L	0.64		NEG	NEG	NEG	Pos	NEG	NEG	NEG	NEG	NEG
Ethyl benzene (f)	EPA 602	ug/L	0.75		Ð	9	9	9	2	9	9	9	9
Ethylbenzene (s)	EPA 602	ng/L	0.75		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
o-Xylene (1)	EPA 602	ug/L	0.78		9	2	2	Ş	9	2	2	2	2
o-Xylene (s)	EPA 602	ug/L	0,78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
m-Xylene (†)	EPA 602	ug/L	0.45		2	QN	2	9	9	9	2	2	2
m-Xylene (s)	EPA 602	υgλ	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
p-Xylene (f)	EPA 602	ug/L	0,78		2	9	9	9	9	9	9	9	9
p-Xylene (s)	EPA 602	ng/L	0,78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 602	ug/L	0,35		9	2	9	9	9	9	9	9	2
Chlorobenzene (s)	EPA 602	ng/L	0,35		NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG	NEG
1,1-0ichlorobenzene (f)	EPA 602	ug/L	0.47		2	9	2	9	9	9	9	2	9
1,1-Dichlorobenzene (s)	EPA 602	ug/L	0.47		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 602	ug/L	0.93		9	2	9	2	9	9	9	9	2
1,2-Dichlorobenzene (s)	EPA 602	ng/L	0.93		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 602	ug/L	0.44		2	Q	Q	9	9	9	9	9	9
1,3-Dichlorobenzene (s)	EPA 602	ng/L	0.44		NEG	NEG	NEG	NEG	NEG	S NEG	NEG	NEG	NEG

DATACHEM ANALYTICAL REPORT Buluth IAP - Water Samples Second Column Confirmations

			De tect ion	Fleid#:	GW4-A	GW4-B	GW4-C	GW4-D	SK-4A	SE-48	SW-4C	SW-4D FOUR	FOUR
Parameter	Method	Units	Limit	Site :	FOUR	FOUR	FOUR	Anor L	5	5			}
Purgeable Arguatics (cont.)	EPA 602	ug/L	MOL						(u •	O	ď	Ş
Benzene (f)	EPA 602	ng/L	0.25		Q S	ON S	9 S	9 99 2	NEG B	. Sos	. 8	S S	NEG
Benzene (s)	EPA 602	ug/L	0,25		3	2	}	ļ			•	Ç	ş
	FPA 602	uq/L	0.64		9	9	2	9	2 9	9 9	2.0 POS	2 5	NEG Z
Toluene (1)	EPA 602	νg/	0.64		NEG	NEG	9	N	NEG	8	3	}	
	8	7	75		2	2	9	9	2	9	9	9	2 (
Ethylbenzene (f) Fthylbenzene (s)	EPA 602	yy. √gu	0.75		NEG	NEG	NEG	NEG	NEG	NEG	NEG NEG	TO ST	อ
			į		Ş	Ş	Ş	9	2	9	2	9	9
O-Xylene (t)	EPA 602	Ng/L	97.0		2 <u>2</u>	, S	SEC.	SEC.	NEG	NEG	SBN SBN	N EG	NEG
o-Xylene (s)	EPA 602	ug/L	0.00		}	 -					j	(4
		5	4		9	2	2	9	2	2	73.	2	2 ;
#-Xylene (f)	EPA 602	7 69	0.45		NEG	NEG	NEG	NEG	NEG	NEG	8	9	e N N
m-Xylone (s)	700 V 13	'n	•						!	ģ	ş	Ş	9
	607	7	0 78		2	9	2	9	9	2	2	<u> </u>	2
p-Xylene (f)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	9	S S S	a 2	
D-VAIGUR (S)		,					Ş	ş	Ş	-	2.8	9	2
	FPA 602	ud/L	0,35		9	2	2	2	⊋ {	2 8	9	N CHA	NFG
Chlorobenzene (T)	EPA 602	ug/L	0,35		NEG	NEG	NEG	NEG	NEG.	€	3	}	}
					ģ	Ş	Ş	Ş	9	2	Ş	S	2
1.1-01chlorobenzene (f)	EPA 602	ng/L	0.47		⊋ {	2 §	2 2	NF.	NEG	NEG	SBN	NEG	NE G
1,1-Dichlorobenzene (s)	EPA 602	ug/L	0.47		NEG	202	3	}	!				
•					9	ş	£	Ş	2	2	2	9	2
1.2-01chlorobenzene (1)	EPA 602	ug/L	0.93		2 9	<u>۽</u>	<u> </u>	N F.C	NEG	SER	89 89	SBS	NEG
1,2-Dichlorobenzene (s)	EPA 602	ng/L	0.93		SHC	NEC S	3	}					
					9	Ş	S	2	2	9	2	2	9
1,3-Dichlorobenzene (f)	EPA 602				2 5	N C	99	93 82 8	NEG	NEG	NEG	NES	NEG
1,3-Dichlorobenzene (s)	EPA 602	ug/L	0.44		}	í :							

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DATACHEN ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

			Detection	Fleid #:	6-MM	M-10	MM-11	A-S-A	G#5-B	545	A2-18	SW-58	SW-5C
Parameter	Method	Units	Limit	Site :	FOUR	FOUR	FOUR	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE
Purgeable Aramatics (cont.)	EPA 602	J/6n	MOL										
Benzene (f)	EPA 602	ug/L	0,25		9	Q	9	9	9	9	9	9	9
Benzene (s)	EPA 602	ηgγ	0,25		NEG	NEG	NEG	NEG	NEG	NEG	N EG	N EG	NEG
Toluene (f)	EPA 602	J/gn	0.64		9	Q	9	9	2	9	2	9	9
Toluene (s)	EPA 602	ng/L	0.64		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 602	ug/L	0,75		2	9	2	9	9	9	2	9	9
Ethylbenzene (s)	EPA 602	ŋ∕gn	0,75		NEG	NEG	NEG	NEG	NEG	NEG	NEG	SE N	NEG
O-Xylene (f)	EPA 602	ug/L	0,78		2	ð	2	2	2	⊋	9	9	2
o-Xylene (s)	EPA 602	1/6n	0,78		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
m-Xylene (f)	EPA 602	ug/L	0.45		9	QN	9	2	9	9	9	Ð	Q
m-Xylene (s)	EPA 602	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	98 88	NEG	NEG
p-Xylene (†)	EPA 602	ug/L	0.78		9	2	Ð	9	2	9	9	9	Q
p-Xylene (s)	EPA 602	ng/L	0,78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
Chlorobenzene (f)	EPA 602	ng/L	0,35		2	9	2	9	Q	9	2	2	9
Chlorobenzene (s)	EPA 602	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	J/gv	0.47		9	Ş	2	9	9	9	2	2	9
1,1-Dichlorobenzene (s)	EPA 602	ng/L	0.47		NEG	NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 602	ng/L	0,93		9	Q	₽	9	9	9	Q	9	Q
1,2-Dichlorobenzene (s)	EPA 602	ng/L	0.93		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 602	ng/L	0.44		9	Q	Q	₽	9	9	2	2	9
1,3-Dichlorobenzene (s)	EPA 602	ug/L	0.44		NEG	N EG	NEG	NEG	SER	NEG	NEG	NEG	NEG

DATACHEM ANALTH ICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

			Detection	Field #:	QW7-A	GW7 43	GW7 +C	A1-78	GWB-A	GW8-45	¥8 8€	SW-8A	SW-88
Par anoter	Method	Units	Limit	Site :	SEVEN	SEVEN	SEVEN	SEVEN	EI GHT	EI GHT	EIGHT	E1 GHT	EIGHT
Purgeable Aromatics (cont.)	EPA 602	ng/L	MOL										
Benzene (f)	EPA 602	ug/L	0,25		9	9	2	9	9	9	ð	2	Ð
Benzene (s)	EPA 602	ng/L	0.25		NEG	NEG	N EG	N EG	NEG	NEG	N EG	NEG	NEG
Toluene (f)	EPA 602	ug/L	0.64		9	9	QN	2	2	2	Q.	2	6.5
Toluene (s)	EPA 602	ug/L	0.64		NEG	N EG	NEG	NEG	NEG	NEG	NEG	NEG	Pos
Ethylbenzene (f)	EPA 602	ug/L	0,75		2	Ş	2	9	9	9	Q	Q	9
Ethylbenzene (s)	EPA 602	ng/L	0.75		NEG	NEG	N EG	NEG	NEG	NEG	98 80 80	NEG	NEG
O-Xylene (+)	EPA 602	ug/L	0,78		9	9	9	2	9	2	QV	2	9
o-Xylene (s)	EPA 602	ng/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG
m-Xylene (†)	EPA 602	ug/L	0.45		2	9	9	9	9	2	Ð	2	9
m-Xylene (s)	EPA 602	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	SB N	NEG	NEG
p-Xylene (f)	EPA 602	ng/L	0.78		2	£	Ð	9	9	9	S	⊋	9
p-Xylene (s)	EPA 602	ng/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
Chlorobenzene (f)	EPA 602	ug/L	0.35		Ş	S	2	2	9	2	2	QN	9
Chlorobenzene (s)	EPA 602	ng/L	0,35		NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	ug/L	0.47		2	9	9	9	Ş	2	QN	2	9
1,1-Dichlorobenzene (s)	EPA 602	ug/L	0.47		NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichiorobenzene (f)	EPA 602	1/6n	6.0		2	Ð	9	Ş	9	æ	9	Q	9
1,2-Dichlorobenzene (s)	EPA 602	ug/L	0.93		NEG	NEG	N EG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (†)	EPA 602	ug/L	0.44		2	2	2	9	9	2	9	2	9
1,3-Dichlorobenzene (s)	EPA 602	ng/L	0.44		N BG	NEG	NEG	NEG	NEG	N EG	SBN	NEG	NEG

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					9	qi et	TRIP	RI NSE
				:	בי ל	7 V V V	DI ANK	BLANK
			Detection	Fleid #:	BLANK	ביייייי	LHO TO	THREE
Parameter	Method	Units	Limit	Site :	A)	SEVEN	5	
(coot)	EPA 602	1/60	MOL					
Purgeable Archailts	507	701	0.25		2	2	2	Q S
Benzene (†)	EPA 602	93/r ug/L	0.25		NEG	NEG	NEG	o Se N
(T) 011071100			,		Ş	2	9	ON
To (1500 (f)	EPA 602	7/60	40.0		NF. G	NEG	NEG	NEG
Toluene (s)	EPA 602	ng/L	0.64		Ì			
		4	27.0		9	9	2	QN
Ethylbenzene (f)	EPA 602 EPA 602	ug/r ug/r	0.75		NEG	NEG	NEG	NEG.
Ethyl benzene (s)					Ş	5	9	QN
	EPA 602	ا∕gر	0.78		2 9	, i	MEG	NEG
O-Xylene (1)	EPA 602	√lon	0.78		NEG NEG	NEG		ļ
					Ş	2	2	ON
•	EPA 602	1/6n	0.45		9 5	7.16	NEG	NEG
m=Xy\ene (1)	EPA 602	1/6n	0.45		NEG.	NEG		
() () () () () () () () () ()			į		9	9	2	Q
	EPA 602	ng/L	0.78		<u> </u>	֖֖֝֝֝֝֝֝֝֝֝֝֝֝֝֝֝֝ ֞	NFG	NEG
p=Xylene (t)	EPA 602		0.78		Z E	S D L		•
					5	2	2	QN
Chlorobenzene (f)	EPA 602	ug/r ug/r	0,35 0,35		NEG	NEG	NEG	NEG
Chlorobenzene (5)	: : :				g	9	2	ON
1 1-01chloroben zene (f)	EPA 602				NFG.	NEG	NEG	NEG
1 1-Dichlorobenzene (5)	EPA 602	1/gn	0.47		2			
	1		80 0		2	2	2	g i
1,2-Dichlorobenzene (f)	EPA 602 FPA 602	7/bn 7			NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (5)	: }				Ś	ç	S	Q
	EPA 602	2 ug/L	0.44		2 9	2	NFG	NEG
1,3-Dichiorobenzene (s)	EPA 602		L 0.44		2 2 2 2 3	NEC S	2	

DATACHEM ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

Par amoter	Wethod	Units	Detec Lim	st ion ilt	Field#: Site :	GW! - A ONE	GW1-C ONE	GW1-D ONE	GW1-E	SW-1A ONE	SW-1B ONE	GW3-A THREE	GW3-B THREE	GW3-C THREE
Pesticides	EPA 608	1/6n	MDL (A)	MDL (†)										
Aldrin (f)	EPA 608	ng/L	0,007	0.02		Ş	Ş	Ş	Q	9	9	ð	ð	Q
Aidrin (s)	EPA 608	ng/L	0.007	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
a lpha-BHC (†)	EPA 608	ug/L	900°0	0.004		Ð	QN	QN	QN	0.01	0.02	2	90*0	0,02
alpha-8HC (s)	EPA 608	ug/L	900°0	0,004		NEG	NEG	NEG	NEG	POS	Pos	NEG	NEG	NEG
beta-BHC (f)	EPA 608	ug/L	90000	0,005		₽	9	2	Q	60*0	0.19	2	Q	2
beta-BHC (s)	EPA 608	ug/L	900°0	0,005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
del ta-BHC (f)	EPA 608	1/8n	0,002	90000		£	9	Q	QN	2	Q	QN	QN	9
delta-EHC (s)	EPA 608	ug/L	0,002	900*0		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Lindene (f)	EPA 608	ug/L	0.005	0,005		9	Q	2	QN	9	Ş	Q	ð	Q
Lindane (s)	EPA 608	N _g V	9000	0,005		NEG	NEG	NEG	NEG	NEG	N BG	NEG	NEG	NEG
Chlordane (f)	EPA 608	ng/r	0.01	90.0		9	QN	Ş	QN	Q	9	Q	Q.	Q
Chiordane (s)	EPA 608	ug/L	10.0	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,41-500 (1)	EPA 608	ug/L	0.004	0,003		9	QN	9	Q	Ş	2	Q	Q	QN
4,4'-000 (s)	EPA 608	ug/L	0,004	0,003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4*-DDE (f)	EPA 608	ng/t	0,005	900*0		9	Q	ð	Q	Q	9	Q	2	9
4,4'-00E (s)	EPA 608	ng∕L	0.005	900°0		NEG	NEG	N EG	N EC	NEG	NEG	NEG	NEG	NEG
4,4'-DOT (†)	EPA 608	1/6n	0.03	0.01		Ð	⊋	Ð	Ð	Q	9	Q	0.02	Q
4,4'-DOT (s)	EPA 608	√g/r	0.03	0.01		NEG	NEG	NEG	NEG	NEG	NEG	Sec	NEG	NEG

H = 2.35

DATACHEN ANLYTICAL REPORT
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Parameter	Method	Units	Dete	Detection Limit	field#: Site :	GW3-D THREE	SW-3A THREE	SW-38 THREE	SW-3C THREE	GW5-A FIVE	SW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-58
Pesticides (cont.)	EPA 608	ug/L	MDL (A)	MDL (↑)										
Aldrin (f) Aidrin (s)	EPA 608 EPA 608	1/6n 1/6n	0.007	0.02 0.02		ND	ND NEG	S 89	ND NEG	ND NEG	NEG KG	NEG NEG	ND NEG	NEG NO
alpha-BHC (f)	EPA 608 EPA 608	1/6n ng/L	900°0	0.004		NEG NEG	ND NEG	ND NEG	NEG NO	G S	G SS	NEG NEG	NEG NE	AE AB
beta-BHC (f) beta-BHC (s)	EPA 608 EPA 608	1/6n 18/1	900*0	0,005		ND NEG	ND	ND NEG	ND NEG	ND NEG	9 9	S S	NEG NG	AD NEG
delta-BHC (f) delta-BHC (s)	EPA 608 EPA 608	7/6n 1/6n	0,002	900*0		ND NEG	NEG NEG	ND NEG	N EG	NEG NEG	Š Š	NEG NEG	OF SP	NEG
Lindane (†) Lindane (s)	EPA 608 EPA 608	1/6n 1/6n	0,005 0,005	0.005		NEG NEG	N EG	N PO NEC	NEG NO	NEG NEG	NEG NO	NEG NEG	NEG NEG	NEG NO
Chlordane (f) Chlordane (s)	EPA 608 EPA 608	7/6n 7/6n	0.01	0,05 0,05		NEG NEG	ND	ND NEG	ND NEG	NEG NEG	ND NEG	NEG	NEG NEG	NEG NEG
4,4'-500 (f) 4,4'-500 (s)	EPA 608	7/6n	Λ_004 ∪_004	0,003		S S	NEG	ND NEG	NEG	N P	Se &	NEG NO	NEG NEG	AEG BEG
4,4'-00E (f) 4,4'-0DE (s)	EPA 608	ug/L ug/L	0,005	900°0		N KEG	ND NEG	ND NEG	NEG NEG	NEG NEG	N ND NEG	NEG ND	NO NEG	ND NEG
4,4'-D0T (f) 4,4'-D0T (s)	EPA 608 EPA 608	αg/L ug/L	0,03	0.01		NG NEG	ND NEG	S S	ND NEG	NEG NEG	ND	ND NEG	N PO	ND NEG

"ND" indicates that the parameter was not detected.

DATACHEN ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

Parameter	Method	units	0.00	Detection Limit	Fleid#: Site :	SM-5C FIVE	GW7-A SEVEN	GW7-B SEVEN	GW7 -C SEVEN	SW-7A SEVEN	GWB -A E1 GHT	GWB-B EIGHT	GWB-C EI GHT	SW-8A EI GHT
Pesticides (cont.)	EPA 608	ug/L ug/L	MDL (A) 0,007 0,007	MDL (†) 0.02 0.02		ND NEG	ND NEG	ND NEG	NEG N	N EG	S S S	S G	ND NEG	ND NEG
Aldrin (s) alpha-BHC (†) alpha-BHC (s)	EPA 608	1/6n n3/r	900°0	0.004		ND NEG	ND NEG	NEG NEG	AD NEG	N NEG	ND	N NEG	N NEG	ND NEG
beta-8HC (f)	EPA 608 EPA 608	ng/L ng/L	900°0	0°002 0°002		NEG	ND NEG	N NEG	NEG NEG	NEG NEG	N N N N N N N N N N N N N N N N N N N	NEG NEG	NEG G	NEG P
delta-BHC (f) delta-BHC (s)	EPA 608 EPA 608	1/6n 1/6n	0,002	900*0		NEG NEG	NEG NO	NEG NEG	NEG NEG	NEG NEG	NEG NE		<u>2</u> 23 €	NEG SE
Lindane (†)	EPA 608 EPA 608	1/6n 181	0,005	0,005		NEG NEG	ND	ND NEG	ND NEG	NEG NEG	NEG NEG	S S	ND NEG	NEG NEG
Chlordane (f) Chlordane (s)	EPA 608 EPA 608	7/6n 1/6n	0.01	0,05		NEG NEG	ND NEG	N REG	ND VEG	ND NEG	NEG	S S	NEG NEG	ND NEG
4,4'-000 (f) 4,4'-000 (s)	EPA 608 EPA 608	ng/L	0.004	0,003		ND	A SEG	S S	ND NEG	NEG NEG	N EG	S S S	S S S	P05 P05
4,41-DDE (f) 4,41-DDE (s)	EPA 608 EPA 608	1/6n 1/6n	0,005	900°0		ND NEG	ND NEG	NEG NEG	N N N N N N N N N N N N N N N N N N N	NEG NEG	S S S	N N EG 5	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	NEG N
4,4'-00T (†) 4,4'-00T (s)	EPA 608 EPA 608	ug/L ug/t	0.03	0.01		NEG NEG	ND NEG	NEG NEG	ND NEG	NEG	2 3	NES SE	S Sã	NEG S

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DATACHEM AMALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

							TRIP	TRIP
			Detect ion	t ion	Field #:	SW-88	BLANK	BLANK
Parameter	Me thod	Un its	t.m.t	+	Site :	EB	ONE	SEVEN
Pesticides (cont.)	EPA 608	ng/L	MDL (A)	MDL (1)				
Aldrin (f)	EPA 608	ng/L	0.007	0,02		₽	Q	9
Aldrin (s)	EPA 608	ng/L	0.007	0.02		NEG	NEG	NEG
alpha-8HC (f)	EPA 608	ng/L	900*0	0.004		2	9	Ð
alpha-BHC (s)	EPA 608	ng/L	900°0	0.004		NEG	NEG	NEG
beta-BHC (f)	EPA 608	ug/L	900°0	0,005		₽	9	9
beta-BHC (s)	EPA 608	ng/L	900°0	0.005		NEG	NEG	NEG
delta-BHC (f)	EPA 608	ug/L	0.002	900*0		2	QN	9
deita-BHC (s)	EPA 608	ng/L	0,002	900*0		NEG	NEG	NEG
Lindane (†)	EPA 608	1/6n	0,005	0,005		9	Ð	Q
Lindane (s)	EPA 608	ng/L	0.005	900*0		NEG	NEG	NEG
Chlordane (f)	EPA 608	ug/L	0.01	90*0		2	Q	9
Chlordane (s)	EPA 608	7/6n	0.01	0.05		NEG	NEG	NEG
4,41-000 (f)	EPA 608	ug/L	0.004	0,003		0,003	Q	Q
4,4'-000 (s)	EPA 608	ng/L	0,004	0,003		P. 85	NEG	NEG
4,4'-DDE (f)	EPA 608	ug/L	0,005	90000		2	9	9
4,4'-00E (s)	EPA 608	ng/L	0.005	900*0		NEG	NEG	NEG
4,4'-DOT (f)	EPA 608	ug/L	0.03	0.01		0.01	Q	Q
4,4'-DDT (s)	EPA 608	ng/L	0.03	0.01		Pos	NEG	NEG

DATACHEN ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

Parameter	Method	si ts	Detec	ection	Field #: Site :	GW1-A ONE	GW1-C ONE	OWI-D	GW 1-E	SW-1A ONE	SW-1B ONE	GN3-A THREE	GW3-B THREE	GW3-C THREE
Pesticides (cont.) Dieldrin (f) Dieldrin (s)	EPA 608 EPA 608 EPA 608	1/6n 1/6n 18/1	MDL (A) 0,005 0,005	MDL (†) 0.002 0.002		NEG NO	ND NEG	ND NEG	ND NEG	ND NEG	N EG	NO NEG	N NEG	0.006 NEG
Endosultan I (f) Endosultan I (s)	EPA 608 EPA 608	1/6n 18/r	0.01	0.036		ND	NEG NEG	NEG NEG	ND NEG	N EG	ND NEG	S S	N NEG	NE G
Endosultan II (f) Endosultan II (s)	EPA 608 EPA 608	1/6n 1/6n	0.01	0.012		NEG	93 N	NEG NEG	NO NEG	N EG	S S	S S	N SS	ND
Endosulfan Sulfate (f) Endosulfan Sulfate (s)	EPA 608 EPA 608	7/6n 1/6n	0.01	0.01		NEG NO	N P	G S	ND NEG	ND	NEG NEG	NEG NEG	N N NEG	ND
Endrin (f) Endrin (s)	EPA 608 EPA 608	1/6n 18/1	900*0	0.02		ND NEG	N NEG	ð å	N REG	NEG NO	NEG NEG	N BG	NEG NEG	ND NEG
Endrin Aldehyde (f) Endrin Aldehyde (s)	EPA 608 EPA 608	1/6n 118V	0.01	0.01		NEG NEG	N EG	9 8 9 8	ND NEG	ND NEG	N RG	N RG	ND NEG	NEG NO
Haptachior (f) Haptachior (s)	EPA 608 EPA 608	J/Gn ng/r	0.007	0,005		NEG NEG	NEG	ND NEG	ND NEG	ND NEG	ND NEG	S S	0.04 NEG	NEG
Heptachlor Epoxide (f) Heptachlor Epoxide (s)	EPA 608 EPA 608	ug/L ug/L	900°0	0.002		ND	ND NEG	N EG	NO NEG	NO NEG	ND NEG	NEG NEG	ND NEG	NEG N
Toxaphene (†) Toxaphene (s)	EPA 608 EPA 608	√Gn 1/Bn	0.25	0,25		NEG NEG	ND	ND	N EG	NEG NO	ND NEG	NEG NEG	N NEG	ND NEG

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DATACHBA ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

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Paromater	₩ thod	ا ا	Detec		Field#: Site :	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE	GW5-A FIVE	GW5-B F I VE	GW5-C F I VE	SW-5A F I VE	SW-5B FIVE
Pesticides (cont.) Dieldrin (†)	EPA 608 EPA 608 EPA 608	7/6n 17/6n	MDL (A) 0.005 0.005	MDL (†) 0,002 0,002		ND	ND NEG	ND	G 23	N N N EG	NEG NO	ND NEG	N EG	ND NEG
Endosultan 1 (t) Endosultan 1 (s)	EPA 608 EPA 608	ug/L ug/L	0.01	0.036		N EG	ND	ND NEG	ND	N EG	N NEG	8 85	N NEG	NEG ND
Endosultan 11 (f) Endosultan 11 (s)	EPA 608 EPA 608	1/gn 1/gn	0.01	0.012		ON SER	93 Y	ON NEG	NO SES	N SEG	NEG NEG	NEG NEG	9 89 2 89	NEG NEG
Endosulfan Sulfate (f) Fndosulfan Sulfate (s)	EPA 608 EPA 608	7/6n 1/6n	0.01	0.01		NEG NEG	NEG NE	S S	N EG	N SE	NEG NEG	N NEG	NEG ND	NEG NEG
Endrin (†) Endrin (s)	EPA 608	ug/L ug/L	900°0	0.02 0.02		ND NEG	NEG	2 8	N EG	N K	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	ND NEG	N EG	NEG NO
Endrin Aldehyde (f) Endrin Aldehyde (s)	EPA 608 EPA 608	ug/L ug/L	0.01	0.01		ND NEG	ND NEG	ND NEG	N SS	ND NEG	S SS	N SE	S S S	ND NEG
Heptachlor (f) Heptachlor (s)	EPA 608 EPA 608	ug/t ug/t	0.007	0°002 0°002		NEG P	ND NEG	ND NEG	NEG N	NEG NEG	NEG NEG	NEG NEG	3 88	S S
Heptachlor Epoxide (f) Heptachlor Epoxide (s)	EPA 608 EPA 608	ug/L ug/L	900*0	0,002		O Se	N SB	NEG	Q S	NEG NEG	NEG NEG	9 8 9 8	NEG NO	9 9
Toxaphene (f) Toxaphene (s)	EPA 608 EPA 608	ug/L	0.25	0.25		ND	NEG	NEG NEG	NEG N	N EG	NEG NEG	NEG NO	N B B B	NEG NEG

DATACHER ANALYTICAL REPORT
Dututh IAP - Water Samples
Second Column Confirmations

Paramatar		:	Detec	Detection	Field#: S	SW-5C	Q#7 -A	<u>ም</u>	GW7 -C	Sw-7A	A-8	9	9	ć
Pesticides (cont.)	EPA 608	ug/L	MDL (A)	_	,	FIVE	SEVEN	SEVEN	SEVEN	SEVEN	EI GHT	EI GHT	E GH	EI GHT
Dieldrin (s)	EPA 608 EPA 608	√gu √gu	0,005	0,002 0,002		S S	NEG NEG	NEG &	NEG NEG	S S	9 99	N KE	2 2 2 2	ON SER
Endosultan I (t) Endosultan I (s)	EPA 608 EPA 608	νg/L υg/L	0.01	0,036 0,036	-	2 8	2 8	ND	N EG	ð å	NEG NEG	S 8	2 8	N ND
Endosulfan (†) Endosulfan († (s)	EPA 608	7/6n 1/6n	0.01	0.012	-	Š Š	호 및 일 명	S S	ND NEG	0.004 NEG	NEG A	9 S	2 8	5 8
Endosulfan Sulfate (f) Endosulfan Sulfate (s)	EPA 608 EPA 608	1/gn 1/gn	0.01	0.01	2	5 3	9 9	NEG &	NEG NEG	8 & 8	8 8	NEG NEG	2 8	S S
Endrin (†) Endrin (s)	EPA 608 EPA 608	1/6n 10/1	900°0	0.02	- Z	ON NE	ON NEG	NEG NO	N N N N N N N N N N N N N N N N N N N	2 99	Q 99	2 8	NE &	NE G
Endrin Aldehyde (†) Endrin Aldehyde (s)	EPA 608	76n	0.01	0.01	~ z	9 9	2 9	(5) NEG	N NG	NEG NO	2 g	9 9	9 B	AEG
Heptachlor (†) Heptachlor (s)	EPA 608 EPA 608	√2/r 19/L	0.007	0,005	~ 2	9 23	9 SB SB SB	NEG NO	ND NEG	2 98 2	NEG NO	NEG NO	6 8	ð Å
Heptachlor Epoxide (f) Heptachlor Epoxide (s)	EPA 608 EPA 608	ug/L ug/L	900°0	0,002	~ Z	S S	N BG	NEG NO	NEG NEG	2 8	2 8	2 99 N	2 88	G G
Toxaphene (f) Toxaphene (s)	EPA 608 EPA 608	76n	0,25 0,25	0.25 0.25	z Z	NEG NO	S S	9 S	N EG	NEG NEG	NEG NO	2 28	2 8	S S

DATACHEN AMALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

							TRIP	TRIP	
			Detec	Detection	Field #:	SW-88	BLANK	BLANK	
Parameter	Me thod	Un I+s		Limit	Si te :	EGH	ONE	SEVEN	
Pesticides (cont.)	EPA 608	νgν	KOL (A)	(±) JQk					
Dieldrin (f)	EPA 608	1/6n	0.005	0.002		9	9	Q	
Dieidrin (s)	EPA 608	√6n	0,005	0,002		SEG SEG	N EG	NEG	
Endosultan 1 (f)	EPA 608	ug/t	0.01	0,036		9	9	9	
Endosulfan 1 (s)	EPA 608	ng/t	0.01	0.036		¥EG	N EG	NEG	
Endosulfan 11 (f)	EPA 608	J/60	0.01	0.012		0,004	9	Q	
Endosulfan II (s)	EPA 608	ug/L	0.01	0,012		SBN	N EG	NEG	
Endosultan Sultate (f)	EPA 608	ا/وم مع/د	0.01	0.01		Ð	9	₽	
Endosulfan Sulfate (s)	EPA 608	ug/L	0.01	0.01		NEG	N 000	NEG	
Endrin (f)	BPA 608	J/gu	900°0	0.02		9	9	9	
Endrin (s)	EPA 608	ng/L	900°0	0.02		NEG	N EG	NEG	
Endrin Aldehyde (f)	EPA 608	ug/L	0.01	0.01		9	Ş	9	
Endrin Aldehyde (s)	EPA 608	ng/L	0.01	0.01		N ES	NEG	NEG	
Heptachlor (f)	B-A 608	ng/L	0,007	0,005		9	Q	9	
Heptachlor (s)	EPA 608	ŋ√L	0,007	0,005		NEG	NEG	NEG	
Heptachlor Epoxide (f)	EPA 608	ug/L	900*0	0,002		9	QN	9	
Heptachlor Epoxide (s)	EPA 608	ug/L	900°0	0,002		N EG	NEG	NEG	
Toxaphene (†)	EPA 608	ug/L	0,25	0.25		2	9	Q	
Toxaphene (s)	EPA 608	ng/L	0,25	0.25		NEG	NEG	NEG	

DATACHEN ANALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

			De tect lon	Fleid #:	A-140	<u>₹</u>	G-136	GW1-E	¥1-¥5	SM-18	GW3-A	GM3-B	G#3-C
Per aneter	Method	Unite	Limit	Site :	ONE	ONE	ONE	ONE	SNO SNO	ONE	THREE	THREE	THREE
Pesticides (cont.)	EPA 608	J/bn	ΨQΓ										
Arochior 1016 (1)	EPA 608	ر ار	60°0		9	9	9	9	9	2	2	2	9
Arochior 1016 (s)	EPA 608	ug/L	0.0		NEG	88 88	NEG	NEG	NEG	NEG	NEG	N GG	NEG
Arochlor 1221 (f)	EPA 608	ug/L	60*0		9	9	2	9	2	9	2	2	2
Arochior 1221 (s)	EPA 608	νgγ	0°0		NEG	N EG	NEG	N EG	NEG	NEG N	NEG	N EG	NEG
Arochior 1232 (f)	EPA 608	ug/t	60°0		9	Q	2	9	2	2	2	9	9
Arochior 1232 (s)	EPA 608	ug/L	0°0		NEG	NEG	NEG	N ESG	N 86	N ES	988	NEG	NEG
Arochior 1242 (f)	EPA 608	ug/L	60°0		2	Ş	2	9	2	2	2	2	9
Arochior 1242 (s)	EPA 608	ng∕L	60°0		NEC CEC	NEG	NEG	NEG	NEG	SE SE	N BC	NEG	NEG
Arochior 1248 (†)	EPA 608	ug/L	60°0		9	오	2	2	2	9	9	2	9
Arochlor 1248 (s)	EPA 608	ng/L	0°0		NEG NEG	NEG	NEG	NEG	NEG	N R R C	NEG	99 N	NEG
Arochlor 1254 (f)	EPA 608	ug/r	60°0		9	9	2	9	9	9	9	9	9
Arochior 1254 (s)	EPA 608	ng/L	60°0		SB	SBN	NEG	NEG	NEG	88 88	8 8	NEG	NEG
Arochlar 1260 (f)	EPA 608	ng/r	60°0		9	Ş	9	9	2	9	9	9	9
Arochior 1260 (s)	EPA 608	ug/L	60°0		SE N	SBN	NEG	NEG S	99 N	SBN	2 2 3 3	28 28 28	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
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			400400	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	2	W I	200	2	4	S.	Š	3	Š
Par anoter	Method	Units	Limit	Site :	THREE	THREE	THREE	THREE	FIVE	FIVE	FIVE	FIVE	FIVE
Pesticides (cont.)	EPA 608	ng/L	M DF										
Arochior 1016 (f)	EPA 608	1/Bn	60°0		9	₽	9	9	9	2	2	9	9
Arochior 1016 (s)	EPA 608	ng/L	60°0		NEG	NEG	N EG	N EG	NEG	N BS	NEG	NEG	NEG
Arochi or 1221 (†)	EPA 608	1/60	60*0		2	윷	9	2	2	2	2	9	9
Arochior 1221 (s)	EPA 608	ng/L	60°0		N EG	N ES	NEG	NEG	NEG	NEG	98 88	NEG	NEG
Arochi or 1232 (f)	EPA 608	1/6n	60.0		2	9	2	2	2	2	2	9	2
Arochlor 1232 (s)	EPA 608	ng/L	60°0		NEG	NEG	NEG	NEG	NEG	NEG	99 28	NEG N	NEG
Arochi or 1242 (f)	EPA 608	ng/L	60*0		9	2	9	2	9	9	9	Ş	9
Arochior 1242 (s)	EPA 608	1/6n	60°0		NEG	NEG	NEG	NEG	NEG	NEG	N EG	NEG	NEG
Arochi or 1248 (f)	EPA 608	ng/L	60*0		2	9	2	2	2	9	2	9	9
Arochior 1248 (s)	EPA 608	ng/L	60*0		NEG	88	NEG	NEG	N EG	NEG EG	88 88	99 80 80 80	NEG
Arochl or 1254 (f)	EPA 608	ug/L	60*0		9	9	9	2	9	9	9	9	2
Arochior 1254 (s)	EPA 608	ug/L	60°0		NEG NEG	NEG	NEG	NEG	NEG	NEG	SBN NBC	NEG S	NEG
Arochlor 1260 (f)	EPA 608	ug/L	60°0		2	2	2	9	2	2	2	2	9
Arochlor 1260 (s)	EPA 608	ug/L	60°0		NEG	NEG	NEG	NEG	NEG	NEG	9 2	NEG	NEG

DATACHEM AMALYTICAL REPORT Duluth IAP - Water Samples Second Column Confirmations

Par ameter	Method	a tsi	Detection Limit	Field #: Site :	SE-5C FIVE	GW7-A SEVEN	GW7-B SEVEN	GW7 -C SEVEN	SEVEN	GW8-A EIGHT	G-88-B E1 GHT	GWB-C ELGHT	SW-8A EI GHT
Pesticides (cont.)	EPA 608	ug/L	Ą										
Arochi or 1016 (+)	EPA 608	ug/L	60*0		2	2	2	9	9	2	9	2	9
Arochior 1016 (s)	EPA 608	ug/L	60°0		NEG	NEG	N EG	NEG	NEG	N EG	NEG	NEG	NEG
Arochlor 1221 (†)	FPA 608	1/011	60.0		9	Ş	Ş	2	9	Ş	9	Ş	Ş
Arochlor 1221 (s)	EPA 608	ng/L	60.0		NEG	NEG	NEG	NEG	NEG	NEG .	NEG.	N EG	NEG
Arochlor 1232 (f)	EPA 608	ug/t	60°0		9	9	9	9	2	9	2	9	9
Arochior 1232 (s)	EPA 608	ng/L	60°0		NEG	98 N	NEG	NEG	NEG	SEG N	NEG	NEG	NEG
Arochlor 1242 (f)	EPA 608	ng/L	60°0		2	9	9	2	2	2	9	2	9
Arochlor 1242 (s)	EPA 608	ng/L	60°0		SE SE	NEG	NEG	NEG	NEG	NEG	N BG	NEG	NEG
Arochlor 1248 (f)	EPA 608	ug/L	60*0		9	윷	9	2	9	9	9	2	2
Arochior 1248 (s)	EPA 608	ng/L	0.09		NEG	N BB	NEG	N EG	NEG	N EG	N EG	NEG	NEG
Arochlor 1254 (†)	EPA 608	ug/L	60*0		9	2	9	2	2	2	9	9	9
Arochlor 1254 (s)	EPA 608	ug/L	60°0		NEG	N BG	98 80	N EG	NEG	99 N	NEG	N BB	NEG
Arochlor 1260 (f)	EPA 608	ug/L	60°0		2	Q	9	2	9	9	2	2	2
Arochior 1260 (s)	EPA 608	ng/L	60*0		NEG	NEG	N EG	NEG	N BB	28 28 28	N GG	N 99 99	NEG

"ND" indicates that the parameter was not detected.

						TR IP	TRIP	
			Detection	Fleid #:	S#-88	BLANK	BLANK	
Parameter	Me thod	st i ts	Limit	Site :	EGHT	ONE	SEVEN	
Pesticides (cont.)	EPA 608	ng/L	¥0.					
1016 (#)	EPA 608	ua/L	60°0		9	9	2	
Arochlor 1016 (s)	EPA 608	ug/L	60°0		NEG	NEG	NEG	
1221 (4)	FPA 608	ug/L	60.0		2	2	2	
Arochlor 1221 (s)	EPA 608	ug/L	60*0		NEG	88	NEG	
1220 / 141	EPA 608	na/r	60.0		2	Q	9	
Arochior 1232 (s)	EPA 608	1/6n	0*0		NEG	S N	NEG	
Acces (4)	EPA 608	40/L	0.09		욮	9	9	
Arochlor 1242 (s)	EPA 608	ug/L	60*0		NEG	N EG	NEG	
Angel of 1249 (4)	EPA 608	uq/L	60*0		2	2	2	
Arochlor 1248 (s)	EPA 608	7/6n	60°0		NEG	SB 2	NEG	
Acces (4)	809 ¥d∃	uq/k	60°0		9	9	2	
Arochlor 1254 (s)	EPA 608	y ng/L	60°0		NEG	98 N	NEG	
(4) (36) (4)	FPA 608	ua/L	60*0		2	Ş	9	
Arochior 1260 (s)	EPA 608	1/6n	0.09		NEG	NEG	NEG	

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GW3-C THREE		NEG &	NEG NEG	N N N
GW3-B THREE		2 8	2 8	9 8 9
GW3-A THREE		S 59	N 88	ON N
SN-18 ONE		S 25	Q SE	NEG
SN-1A ONE		9 9 9 9	9 9	8 8
GW1-E ONE		9 9	N NEG	N NE
GW1-D ONE		N N NEG	9 99	9 9
ONE C		N N N N	9 9 9	S SS
GW1-A		S S	9 8	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
Field#:				
Detection Limit	NO.	0.08	0.08	0°08
thits.	ŋ∕gv	1/6n 10/F	ug/L ug/L	1/6n
Method	BA 615	BPA 615 EPA 615	BA 615 EPA 615	EPA 615 EPA 615
Parameter	Herbicides	2,4,5-T (f) 2,4,5-T (s)	2,4-0 (†) 2,4-0 (s)	Silvex (f) Silvex (s)

DATACHBA ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

	:	:	Detect ion	Field#:	GW3-0	SW-3A	SW-3B	S#-3C	GW5-A	G#5-B	GW5-C	S#-5A	SW-5B
Par ane ter	Method	si is	Limit	Si te	138E	THEE	I E	THEE	FIVE	FIVE	FIVE	FIVE	FIVE
Herbicides	BPA 615	ng/r	MOL										
2,4,5-T (f)	EPA 615	ug/L	90.0		9	9	9	9	9	2	9	9	2
(8)	EPA 615	ug/L	90*0		NEG	SBN	NEG	NEG	NEG	NEG	NEG	N EG	NEG
.	EPA 615	ug/L	90*0		9	9	2	2	9	2	2	2	2
2,4-0 (s)	EPA 615	ug/L	90°0		NEG	N EG	NEG	N EG	88 88	88 8	NEG	NEG	NEG
Silvex (f)	EPA 615	ng/L	90*0		9	9	ð	9	9	9	9	9	9
SIIvex (s)	EPA 615	ng/L	90*0		NEG	NEG	SB N	NEG	NEG	NEG	SB SB	SB	NEG

DATACHER ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

			Detection	Field#:	SM-5C	GW7-A	₽	£7.45	A7-78	GWB-A	4 4 8	Q#8 C	8- 8€
Par anoter	Method	Units	Limit	Site :	FIVE	SEVEN	SEVEN	SEVEN	SEVEN	EI GHT	EIGHT	E1GHT	EIGHT
Herbicides	EPA 615	ng/L	J Q										
2,4,5-T (f)	EPA 615	Mg/L	0.08		2	90.0	9	9	9	9	9	9	2
2,4,5-T (s)	EPA 615	ng/L	90°0		NEG	POS	N EG	N EG	8 8	98	9 9	88 88	NEG
2,4-0 (+)	EPA 615	ug/L	0,08		9	9	9	9	9	60.0	9	9	9
2,4−0 (s)	EPA 615	ug/L	90°0		N EG	NBG NBG	NEG	99 N	NEG	N 66	99	NEG	NEG
Silvex (f)	EPA 615	ug/L	0.08		₽	2	2	9	9	9	2	2	9
SIIVER (S)	EPA 615	J/gn	90*0		NEG	NEG NEG	NEG	NEG	NEG	NEG S	N EG	NEG	NEG

DATACHER ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

						TRIP	TRIP	TRIP
				Field #:		BLANK	BL NAK	BLANK
Parameter	Method bothod	units	Limi+	Site :	EI GHT	ONE	THREE	EIGHT
Herbicides	EPA 615	ng/L	MDL					
2,4,5-T (+)	EPA 615	ug/L	90.0		2	9	2	Q
2,4,5-T (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG
2,4-0 (+)	EPA 615	ug/L	0,08		2	9	9	Q
2,4-0 (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG
Slivex (f)	EPA 615	ug/L	0,08		9	9	9	9
Silvex (s)	BPA 615	ug/L	90.0		NEG	NEG	NEG	NEG

APPENDIX I CORRESPONDENCE WITH REGULATORY AGENCIES

COUNTY NAMES & LOUIS	21411	Or ministration		R WELL F	
	9 5%	Z Y		V-NE	2. PROPERTY OWNERS HAME Air Nath'l Guard
Dutance and Direction from Road Intersections or Street Address	ne and City of Well Lateries	7	<u> </u>	<u> </u>	Duch, MN 55811
Show exact location of well in vectors gold with "X."	mad Ba	mker "	>/C	ill location.	4. WELL DEPTH (completed) Date of Completion
	thus Name	_×_>	<u> </u>	- <u>×</u> -	13.0 n. 2/11/86
ν ε ε ε	t. Number	CWIDE			2□Hadrowand S□Air B□Beard H□
	Number 1				S. Rudery of Ireland Of Province August
	\ T				1 □ Demonstr 4 □ Public Supply 1 □ Industry 2 □ transition 5 □ Municipal 4 □ Communital
1. FORMATION LOG	COLON	HARIMASS OF	FROM	10	2□lertgetten S□Mentelpel e□Commercial JEGree Well e□Air Conditioning e□ 7. CASING HEIGHT: More/below HOLE DIAM
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Silty GraveRy Sand	prom	hard	75	B	2 Gain. S Wedded Surface R. S Plastic all 5.5 told Orino Shout You No 17
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e pearoci-		ļ	13		in. toft. Weightftth. toft.
			-		Statute On O Time
					Best Course Oco Longin 10:0 ft
·					Set between 13 n. and 3 h.
					V. STATIC WATER LEVEL 451 10 States Date Managered 1/2/87
					10. PUMPING LEVEL (below land surface)
					ft. after brs. pumping
·				ļ	11. WELL HEAD COMPLETION
i					2 Between office 3 At least SF above grade 12. WELL GROUTED?
					Aves □160 Filters Coment CAR Spentensite 3□
					Ores manufal best tonife men 3 10 2 1 00 Var
		 			hert and 20
					13. NEAREST SOURCES OF POSSIBLE CONTAMINATION N 30 fort
·				<u> </u>	Well disinfected upon completion? Yes Nyl 5.76.10
·		ļ ·			IA. PUMP
					Dute Installed
1					Model NumberNPVolts
ļ	 			-	Length of drop pipe
1		 			Type: (Submicrotitée
Use a second	abort, if product			<u>. </u>	16. WATER WELL CONTRACTOR'S CERTIFICATION
Split Spoon Sw	ples to	aken			This will was defined under my jurisdiction and this report is seen to the best of my hapviseles and belief.
į į į	L				Electrica Districta Home Electric No.
1					Address
	•				Signed Date Date
1					Date
IMPORTAL		ov 1	94	748	Nome of Driller

Company Name St Lois				RWELL F	44.01.00
Toronthip Home Toronthip Home	kange Humber Sect	2 SE	= ·SI	Y-NE	Air Natolt Grand
Air National O	Ward Ba	se t	 ان <i>ل</i> اح	th	Duth, MV 55811
Show exact incollen of well in section grid with "X.") Idina Name	Bute	1 may of -	di lucation.	4. WELL DEFTH (completed) ZOO 12/11/86
			1	_ <u>/_</u>	5. (C)Colde tool 4 Reverse 7 Driven 19 Dag
	4				2
	1 Number	· +			A USE
1. PORNATION LOG	COLOR	TARIHET PARTIES	FROM	TO	2 treignation 5 Montespart 6 Communicated 250 Test Well 6 Air Crossing 9
Pert	donk brann	Soft	0	7	7. CASING HEIGHT (Abov) Badow HOLE DIAM
aleyen Sandy Silt		Sofa	7	20	10 Cats. 50 Worked Surface 2116 R. 10 Plastic Will Star Crim Short You No.
				†	2 11 10 42 5 11. WASH NAM NAM
	 			 	
	1 1			}	L SCREEN Gropen hole Make ft. to ft.
					Tron Stainless Steel on 2 inch
					Set between 1915 R. and 9.5 R.
					1. STATIC WATER LEVEL
					10. PUMPING LEVEL (Polors land surface)
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					Prizone edeptor, manufacturormodel
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·					14. PUMP
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					3 hr 4 \(\sum_{\text{contribut}} \)
12 REMARKS, ELEVATION, SOURCE OF DATA, etc.	shoot, if accept		L		16. WATER WELL CONTRACTOR'S CERTIFICATION This well was drilled under my jurisdiction and this report it then to
Split Spoon So	emples Ti	aka	ı		the Sust of my Encentrolps and Bollef.
	ŧ				Ederage Business Huma Ederate No.
		•			Address
					Signed Authorized Representative
					Note of Delite 100 Marie 1
IMPORTAN		1	94	749	

THE WITH DEED - WELL OWNER COPY 194750	LOCATION OF WILE		*****		RECORD MINNESULA UNIQUE MELLA NO. 194750
The second control of the second of the seco	l	her Range Humber E Section No		405	J. PROPERTY OWNER'S NAME
SALES STATES AND STATE	Dutance and Direction from Road Interactions or Street Addr.	ess and City of Well Laboration	-pc yw	<u> </u>	1 444
South Barry 18.0 12/7-186 1	Air National an	ard Box.	Delett	`	
Comment Commen	Show stact hication of well in section grid with "X."	Name Ola "	start and all all and	age	18-0 12/7-186
The name of the na					3-1 Cobbs sout 4 Reverse 7 Others 10 Dag
Weekling to State Channel Channe	□ 				· · · · · · · · · · · · · · · · · · ·
The property The		- Humber	<u> </u>		• • • • • • • • • • • • • • • • • • • •
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Clegg Gravely Si II brown Med 7 18 1. 18 1. 1946 1. 19	Peat	bran Sos	#2	7	10 Plastic alt 500 Drive Sheet Va _ No X
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Type: 1 Schwerzitte ADL & Turbles SChergenesing Color ADC					
Live a percent above, if moving IA. REMARKA ELEVATION, SOURCE OF DATA, one. This wall was drilled under any jurisdiction and this report is true to the best of my honoradge and belled. Livener Bushness Home Livener Ma. Address Signed Authorised Representative FILE WITH DEED — WELL OWNER COPY 194750 HE-41806-01				ı	
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Spirt Spoon Samples taken. Legener Bushase Name Levense Ma. Address Signed Authorized Representative Mass of Deller M		d'about, if receded			4
Signed Authorited Representative Date Authorited Representative Date Date Name of Drifts WITH DEED - WELL OWNER COPY 194750	Split Spoon	Samples	taken.		•
IMPORTANT: FILE WITH DEED - WELL OWNER COPY 194750	(·			Edicenses Dustrians Harrie Edicense Min.
IMPORTANT: FILE WITH DEED - WELL OWNER COPY 194750					Address
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FILE WITH DEED - WELL OWNER COPY 194750					
PILE VILLE DEED - WELL CONNER COPY 11 34 1 00 HE GIBBLE			101	750	Name of Driller
1 = 3	FILE WITH DEED - WEL	L OWNER COPY			

crossy name St Lovis			WELL REC	per water samp	194	1784
Township Name Township Num 50	Hange Humber Sections	- VW KW	= 1 1.1	ROPERTY OWNER'S NAME	rel Grand	
AV 1 h Tro- 0	TOU and City of Wol Labeling	· /	y ·		(N) 55B11	
Shirtor a sact fraction of well in rection gold with "E."	yraa p	Shores map of well	I torration. 0. W	ELL DEPTH (completed)	Date of Completion	
	Hiten Henry	B ald there of		20.0	. 2/6	
W - : - : - : - : - : E : : : : : : :	rd Humbur —X-	old 19700 5 -K-x-x-	-X- 10	Ocidis suel 4□Revotes Ottobles suel S□Air	7□ Drives 10□ 8□ Smod 11□	· · · · · · · · · · · · · · · · · · ·
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Silty Gardy Sand	brown N	led 85	20 ,00	ah. s□wadad	201 n	
July July	DOCK P	WOLL COS		leatic 455,950cl 2 10 10 10 1	Drive Shoot Yes No A. N. Welghtte.//	23.20n
			_		R. Weight	
			r K		Or open hole	·
			Ty	Stainless St	tel on Z	in
				1/Const	ings	FITTINGS:
				ATIS WATER LEVEL	n.	
				##53.8 AL	Date Messe	1/2/87
			10. 90	IMPING LEVEL (below lead surface)		
				n.sher		
				ELL HEAD COMPLETION] Prilors edapter, manufacturer		
	<u></u>			EL OROUTED?	At least 15" above grade	
			<u></u>	Ness Central CAP 2 Dens		į
	ļ		Orem a	bestonite.	<u> </u>	A. Cu. Yes.
				Com,-bent. host-omen	120	
			13. HT.	AREST SOURCES OF POSSIBLE (CONTAMINATION U	thous
				'vil disinfected upon completion?	CONTAMENATION Superitor Yorl No.	Site8
			14, PU	MP		
			7	Date installed	And tended	
				Minter		.v
				gith of drop pipe	ft. capacity	
			J	e: (DSpharetty X	□L.S. Tuttin s□torp	
Use a sessed of IA REMARKS, ELEVATION, SOURCE OF DATA, sta.	ant. If accepted		10. WA	A TER WELL CONTRACTOR'S CERT	DEVENDED 6D	
		<u> </u>			jurisdiction and philo report to true to	
Split from sa	myles to	Ken				
•	•		}	Lacons	nee Brighnata Maring	Linear He.
				A48ma ,		
			1	Signed	rierd Representative	*
					of Orthor	**
IMPORTANT FILE WITH DEED - WELL	: Owner copy	19478	34	Nome :		海里

Crossly Name S CONS			DE MINNISOES	WATER	WELLE	RECORD for Water Sample 194785
	Township Number	Range Number S	rctima No. Fran	1440 -		1. PROPERTY OWNER'S NAME
I between and I become from Mand Intersection	Courseling Hujerber	15	2 N	ESW	文:	Air National guesd
Air Nations	e gr	Λ	se T	mlv	th.	Pull, MN 55811
Show's sect function of will in syrtian grid with	-X."	tom:	Sheri	C () () A	l tocation.	13.0 Date of Completion 12/6/86
		old	- DIDU	GWB.A Street	-315-	5-10CoMe tool 40 Reverse 10 Delea 100 Day
W	March Num		— <i>X</i> —X—	- <i>X</i> -X-	-3/2-	2CHriston red SCAir BC Board (1C
1 1 1 1 1 1 1 1 1 1	Let Num	\\$				3C Retary 6 Jerus 1 Transpor Augus
		W	ishing to	· Rd		
1. FORMATION LOG	<u> </u>	COLOR	HARIMIT OF	FROM	10	2 regertion 5 Medicipel 9 Commercial
}						7. CASING MEIGHT: foodbythag 4
Clayer Silt	t	m	SUA	0	13	10 Black defineded
						SU Cutr. SU Wedned Surface L T T R.
						- 3 B
	İ					
						in. toft. Weight
			ļ <u></u>			Mobile
						Type Starklan Steel on Zin.
						BrifGen. 3
						11. and 11.
						9. STATIC WATER LEVEL
			<u> </u>			1 Specime Date Messaged 12/87
			•	1 1		10. PUMPING LEVEL (below land surface)
			<u> </u>			ft. after hrs. pumping
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! 	1					2 Resement offset 3 At least H* above grade
ļ			<u> </u>			IE WELL GROUTED?
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					1	Grow mucros bartonite ma 3 4 2 1.00 You
						heat and 2-0
						15. NEAREST SOURCES OF POSSIBLE CONTAMINATION
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						N 100 for Surection UKN5M type Well disinfected spea completion? Yes□ tent Si7c8
			1			14. PUMP
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						Monifecturel's Home
						Model Number
			 			Longit of drop pipe ft. capacity S-p.m.
			1	}		Meserial of drop pape Type: 1□Submerable J□L.S. Turbins S□Restpressing
			 			2 → 10tm 4 → 10tmmingsl 0 → 10tmmingsl
IS. REMARKS, ELEVATION, SOURCE OF	Use a second obser	L. If model	L			16. WATER WELL CONTRACTOR'S CERTIFICATION
		al . —	taken	L		This well was delited under my periodication and oble report in crust of the best of my knowledge and bullet.
Split Spon	sam	rs,		•		Liverson Business Human Liverson No.
,						License Businese Home License Mu.
			•			Address
						Authorised Representative
						Dete
IMPO	ORTANT:		. 1	917	725	Number of Diffleet System Syst

1 LOCATION OF WELL !				WELL R	RECORD for Water Sample 194786
Township Name 570	15	ZW	*****		The second of th
Datance and Describe form Read Intersections or Street Address	ward ba	· D	الرداري	h	Air National grand Duth MN 55811
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		GN4	D	_	5. 1 1 1 1 1 1 1 1 1
W E	, martin	(—X—X	~ × *{	$\ \cdot\ $	2 Hediew and 5 Air 6 Barrel 110
					6. USE 1 Transcrite 4 Tradic Supply 1 Industry
1 mile	COLON	HARIMISS OF	FROM	10	2□tripation 5□trimitripal 6Ūtriminorial
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Class	Jan	haca	125	19.5	2 m 15 m 15 m 120
City C.	1.00	-	19.5	25.0	
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					BrifCassa 25 15 Langes 10 STITIMOS:
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					10. PUMPING LEVEL (below land surface) ft. ofter
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		ļ			12 WELL GROUTED? AVer □No
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		<u> </u>			Com-bent, 11 2 heat amt 20
	•				18. MEAREST SOURCES OF POSSIBLE CONTAMINATION APPL type
					Well disinfected upon completion? Yell Next Size
·	: 				14. PUMP
) 		Done Installed
					Legal of the pipe
					Molecular of drop page Type:
					2Contribud 6C
18. REMARKS, ELEVATION, SOURCE OF DATA, etc.	obset, If gooded	l	L	L	16. WATER WELL CONTRACTOR'S CERTIFICATION This well was defined under stry jurisdiction and this support in true to
Spit Sporm S	Jungle	take	2		the best of my boundage and bellef. Licenser Business Hume Licenser Mis.
					A40
					Signed Date Date
					Date
!M?ORTAN		PY 1	94	786	Name of Drilles

County Marie St Louis				I WELL P wswm/131	134101
Township Numb	Hange Humbur E	ZV	EE	'SW'	Liv National Guard
Air National C	Juard B	ase, I	Polof	h_	Dolut, MN 55811
Show exact location of well in section grid with "X." Added	- North	v4c	ch map of we	il location.	4. WELL DEPTH (completed) 2000 1. 12/3/86
W E Beet	. Humber	<u> </u>			3. (□C) of the total 4□ Reverse 7□ Orthon 10□ Dag 2□ Holdons and 5□ Air 8□ Based (1□
	1,5	x-x-	× 3		3 Notary 6 Setted 9 Youwer Augus
		OO	0		I ☐ Trumponic 4 ☐ Public Supply 1 ☐ Industry
1. PORMATION LOG	COFOR	HARINIPS OF	FROM	10	2 Integration S Monicipal 2 Communication 3 Street Well 6 Air Conditioning 9 1. CASING HEICHT Abor) Delaw HOLE DIAM
Fill Gravel, Sit	tan		0	.2	1 Stock differented \$1 Gate. \$1 Webbed Surface 27 8.
Sendy acyay Silt	brown	8681	.2	125	SUPRETICE SASSES OFFICE SHOPE VOL No. X 453 201
Clan	brown	tagh	12.5	20	in to No. No.
					Tim Stair Un Steel on 2 in
					Sel between ZO ft. and LO ft.
	· · · · · · · · · · · · · · · · · · ·				1. STATIC WATER LEVEL 8. 5. X 5. 1/12/87
					10. PUMPING LEVEL (below land surface)
					ft, after brt. pumping
-					TI. WELL HEAD COMPLETION Prices adapter, manufacturer
					SE WELL GROUTED?
	·	 			1) (Nest Comen CAT) 2) Commonte 2
					Orout material BONTON Con from O in G A. Co Ve
					13. HEARBIT BOURCES OF POSSIBLE CONTAMINATION 15. HEARBIT BOURCES OF POSSIBLE CONTAMINATION 15. Energies 17. Fort
		ļ			N 400 foot SSE Struction MANTA type Well districted upon completion? Yes□ type Sife 4
· .					14. PUMP
					Once installed
				,	Legit of drop pips R. capacity
					Material of drop pape Type: 1 Submercials SDL S. Turbine SD Restgeneeting
	about 16 personal				2
16. REMARKS. ELEVATION, SOURCE OF DATA, sts.	shoot, If needed		L		To. WATER WELL CONTRACTOR'S CERTIFICATION This well was defined under any jurisdiction and this support in true to the best of my knowledge and belief.
Split Spon So	empla	tak	u.	:	License Business Home Elemen No.
	•			ļ	Min
					Signed Date
					Authorized Representative
IMPORTANT	: OWNER COP	y 1	94	787	Name of Orthor 771 She 771 She 171 She

LOUATION DE WELL LOUANTY Marker ST COICES				RWELLI	/o
Township Hump	9 15	incum No. Fra	14 50		A. PROPERTY OWNER'S NAME
Dutance and threeting from Road Intersections or Screet Adde	ross and Cray of Well Location	<u> </u>	EE	. <i></i>	Ar National guard
Air National 1	grand !	Jase	Del	uth	DUM, MN 55811 4. WELL DEPTH (completed) Dois of Completion
	Ittems Name				20.0 12/3/86
W	ch Number	/ X	ج ۲۰۰۰	1 2	5. Carlot tool 4 Revote 7 Cities 18 Dag
	+	00	o ĵ	- I	2 Streetwo read S Air S Barred S S S S S S S S S
	man CW Y		-x-£		& USE
1 mile			7	·	2⊡bylatton S□Honkripal S□Communial
2. HORNATION LOG	COLON	HARIMESSOF	FROM	10	1. CASING HEIGHT: Songware MOLE DIAM
Year, with clay	brain	Saft	0	6	10 Stark 4/A Throaded 20 Cade. 5 Wedday Sarken 242 n.
Clay	gray brown	20/4	6	G.2	10 Martic AS, Steel Drive Shart Va _ NOX + 534 4201
fine Sitty Sanday	brann	50/7	6.2	126	In. to
Claves sandy 5:11	boom	Sup	126	26	a. SCREEN Cropen hole
				<u> </u>	Tros Steinles Steel On Zin
		}	 -		Box/Cause 0.01 Longth 15 ft
		ļ			fromfr
			,		STATIC WATER LEVEL 3.0 18 Autom Date Manner 1/12/87
					Gad burton 10. PUMPING LEVEL (botom land surface)
					ft. efter
	 				TI. WELL HEAD COMPLETION (Palcon adapter, manefacturer
					2 ☐ Stagement offset 3 ☐ At least 15" above grads 12. WELL GROUTED?
					XVvs □Ne
					OFFICE COMPACT OFFI SPENSIONE 30 OFFICE OFF
					heat cement 2 0
					II. NEAREST BOURCES OF POSSIBLE CONTAMINATION
·					Well disinfected upon completion? Yes My
					14. FUMP
					Discr Installed
		ļ			Macoferrord's Prime
	 				Longith of drop pipe Nr. copacity
					Types I Submersible ISLE Turbine SURresponding
I					2□let 4□CrossRapid 6□
15. REMARKS, ELEVATION, SOURCE OF DATA, OL	about, if apoled	اــــــا ا	LI		16. WATER WELL CONTRACTOR'S CERTIFICATION This well was drilled under my jurisdiction and tible report in time to
Split sporm Sa	mpu t	akir.			the best of my hazastedge and bellef.
,	•				Elevater Budiness Name Elevate Ma.
					Address
					Signed Authorized Responsibility
					Date
IMPORTAN		1	947	788	Name of Drifting 9.74 32M

St. Lon's				R WELL R	/dr water samper
	15	Sections No. 112	-4	SW.	1. PROPERTY OWNERS NAME ATT National guard
Air National (Juad Br	Se	Dh	th	Darth, MN 55811
Show exact furnition of wall in section grid with "X."	U Ithus Harms /		× ×	di Jacobia.	4. WELL DEPTH (completed) 20:0 12/3/86
- - - - - -	-K	- /-/ -/-/	<u> </u>	الم. ا	5. I Colds total 4 Reverse 7 Divisor 10 Dag
W E	h Number		==	1	20 Holdow rad 5 CAir 8 Disord 110
	Number	+		'	3 Notory 6 Jetted Presser Augur 6. USE
\$		CHN4 N	R	<u> </u>	i Chamenite 4 C Public Supply 1 C Industry
1. FORMATION LOG	COLON	HARITHIAS OF	FROM	10	2
Fill 4 macadam	brown	SOFF	0	03	7. CASING NEIGHT: May Padow HOLE DIAM 1 Stock 4 Threaded Sortice 2.59 R.
Clayer Silt-Part	brown	SOF	0,3	3.5	10 Plastic at 5 Flat Drive Sheet You - No X 53m to 20 R.
Silty Sand	pronn	80/1	3.5	95	
Gilty Sandy Clay	gran	Soft	4.5	41.5	8. SCREUN Or open hole from ft. to ft.
dayer Silt	pronn	808	11.55	20	Type Starling Teel On Zing
					Ser between Zel ft. and 5 ft.
					9. STATIC WATER LEVEL 2.6 CALLED THE DATE OF THE PARTY O
		 	 -		7. Abelian phone Date Measured 77 37 10. PUMPING LEVEL (below last surface)
		<u> </u>			fl. after bes. pumping
			Ì		n. sher her pumpins
<u> </u>		f		!	(Pitions eduptor, manufacturermodel
		ļ			12. WELL GROUTED?
					Man DNo Monet Comen CATP 200 Sentante 30
					area material beatricts area 4 10 2 R. Ca. Va.
		 			Report Cemit L
		ļ	 		12. MEAREST SOURCES OF POSSIBLE CONTAMINATION 12. MEAREST SOURCES OF POSSIBLE CONTAMINATION 13. MEAREST SOURCES OF POSSIBLE CONTAMINATION 14. MEAREST SOURCES OF POSSIBLE CONTAMINATION 15. MEAREST SOURCES OF POSSIBLE CONTAMINATION 16. MEAREST SOURCES OF POSSIBLE CONTAMINATION 17. MEAREST SOURCES OF POSSIBLE CONTAMINATION 18. MEAREST SOURCES OF PO
			ļ		12. NEAREST SOURCES OF POSSIBLE CONTAMINATION
					14. PUMP
		ļ .			Date installed
				<u> </u>	Manufactured's Name
		 			Leight of drop pipe ft. capacity
1					
		<u> </u>		 	2□ Jet d□Crostifugal d□
Use a second 11. REMARKS. SLEVATION, SOURCE OF DATA, etc.	short. If morded	1	<u> </u>	L	16. WATER WELL CONTRACTOR'S CERTIFICATION This well was drilled under any jurisdiction and this report is thus to
Split Span	Samp	h t	ak	فر	the best of my knowledge and bellef.
' (1				;	Licenses Business Huma Licenses Mo.
1				i	Signed Date Date
IMPORTANT FILE WITH DEED - WELL	T:	y 1	94	789	Deld

County Raine St Louis	·]			R WELL 1	
Township Name Township Numb	\$ 15g	Z SV	V XE	ESW	Air National guard
Air National Ope	id Baze	D	1.41	7	Dulum, MN SSBII
Show exact becation of wall in spritten grid with "X." Addit	ton Nome	\$ Shorte	16	W3-P	18.9 Distr of Completion 12/2/96
W	Number	DPDO			5. (Civile test 4 Revene 1 Orders 10 Dug
		Storage			2
	Humber				6. USE 1□ Nomestic 4□ Public Supply 1□ Industry
2. FORMATION LOG	COTON	MARINIST OF	FROM	10	2 Integration S Membrined G Communicated ART year Work 6 Air Conditioning 9 1 1/CASING HEICHT: (And-) index MOLE DIAM
Sandy Clayer Silt	prom	8087	0	6	1/CASING
Clar	brack	50/4	6	6.5	10 Practic of 5. Steel Drive Sheet You No X 53m. to A. R.
Silly agree Sand	brown	8097	65	15	10. World
Sende Sith Clan	brown	809-	15	45.2	
Sith Classed Sound	brown	8/4	15,2	85	Tron Stein Lon Steel on 2 in
7		<i>=(</i>			Set between Reg. N. and 3.9 n.
					9. STATIC WATER LEVEL
					4.02 (1. Defense of shore Code Measured 1/12/82) 10. PUMPING LEVEL (below lifed surface)
					ft, after
		 			17. WELL HEAD COMPLETION □ Pitions adapter, manufacturer
					2 Basement offset 3 At least 15" above grade 18. WELL GROUTED?
					Most Coment CAR - 20 Bentonite 30
				<u> </u>	neat and 2 0
					IL HEAREST GOURCES OF POSSIBLE CONTAMINATION
					Well dissoluted upon completion? Vell Make Very Vell Make Very Sire S
					14. PUMP
					Code installed Not installed
					Model NumberN, specify
					Noterial of dapp paper
					2 Jet 6 Cressings 6
13. REMARKS, ELEVATION, SOURCE OF DATA, etc.		·			16. WATER WELL CONTRACTOR'S CERTIFICATION This well was drilled under my jurisdicates and this report is true to
Split Sporm.	Samples	to	Ken	,	the best of my barrelodge and belief. Liveness Business Name Liveness Ma.
	. L				Licenses Budeon Home License Mo.
					51
					Authorized Representative
IMPORTAN FILE WITH DEED - WELL	IT: OWNER COI	y 1	947	790	Notice of Delbar

County Name SA Lovis		WATERW	WELL R	/or
Township Number Township Number 50	Hange Number Serting Na.	SW SE	SW	3. PROPERTY OWNER'S NAME AN Natronal good
Distance and Direction from Board Internetions on Server Address And And Andrews	on and City of West Location	Dulh		DULLY MN 55811
Show exact because of well in species grid with "X."	time Name	Sherich map of wall in	acellen.	19, 6 Does of Completion
W	, 6			5- t Colde total 4 Revorse 70 Drives 18 Dag
	Sto	PO L		2
1 L <u>. L. /u>	1 CU 3-C	<i>ac</i> ,		6. USE
1 mClo-	COLOR HARINIE	S OF FROM	70	3 Seriestina S Municipal S Communicated
Clara Silt	bron Six	-0	5	ANT Took Well 6 Air Creeditioning 90 7. FASING MEXCHT. (Shr) Below MOLE DIAM 10 Stock 45 Throughold
Silly Band Clar	boom Sell	51	15	20 Cate. 5 Wester Surface
City Con City	brown Sol	2-1	g	2 in 10 9 11 Water Name 45.3 in 10 7.1.
Ding Clayer Sana	800	<u> </u>	4	in. to
	<u> </u>	- -		Make
				Sol/Geese Longen Longen Longen PITTINGS:
			•	Set between ft. and ft.
				STATIC WATER LEVEL 43
				16. PUMPING LEVEL (below lend oursets) 8. efter brs. pumping
				11. WELL HEAD COMPLETION
				/ Philose adapter, manefactorermodel
				12 WELL GROUTED?
				Oran material blest Dasit & oran 2 to 5 a. Oz. Var.
				Com-bent 5 2
				13. NEAREST SOURCES OF POSSIBLE CONTAMINATION (5) Fort Street, Street
				Well dissificated upon completion? Yes Name Site 3
				Date Installed
				Model Number
				Motorial of drop pape Type: Submercially SQL-8, Turbine SQ Restpraceling
· ·		1		2 Int 4 Constitued 6
18. REMARKS, BLEVATION, SOURCE OF DATA, 448.	and the	- <u></u> 1		16. WATER WELL CONTRACTOR & CERTIFICATION This well was defined under my jurisdiction and this report is tree to the best of my beautidge and belief.
Spir Spoon SN	mus take	١.		License Bushasa Hame License Mo.
		,		M4ma
				Steam Date
				Authorized Representative
IMPORTAN FILE WITH DEED - WELL	T: OWNER COPY	1947	91	Date Date

CHAMP Name St Lans				WELL 6	RECORD for Water Sample 194/92
Township Hume Township Him	North Number E	Z S		-5W*	J. PROPERTY OWNER'S NAME
Ilutance and Description from Read Intersections or Street Adds	va and City of Well Lacation	. 7	1.11	7	Doluth, MN 55811
Show start because of wall in sertion grid with "X."	Mrs Dis	<u>₹, </u>	ith map of th	d lecoles.	4. WELL DEPTH (completed) Date of Completion
	Mome	<u>+ </u>	 -	· 	20,0 n. (2/1/876) 5.10 Cohic total 40 Revens 70 Protects 100 Drug
W E	th Number	Story	2		2C) Hollow red SC) Air SC) Based . 11C
	(Number	anen	(C.)		31 Redary 61 Setted Of Councer August
3			-		Commente 4 Profile Supply 1□ Industry S□ Infustrion S□ Municipal S□ Commented
2. HORMATION LOG	COLOR	MARINIST OF	FROM	10	2ÀCrost Well 6□Air Constituting 9□ 1.*CASHIG HEIGHT: #5000@dow HOLE DIAM
Silty Clay	brown	Soft	0	11	10 Burt de Traveles 10 Cabo 10 Walded Surface 2.33 a.,
Clair	green-tan	Soft	h	125	SCI Plantic of S. Sleet Drive Shoot You - No X 53 20,
Grave Cond	brown	Sox	125	10	in. toR. WeightRayRR. BayRR.
J. W. I.		0.		-	in. to N. Weight Ne., (R ln. to ft ln. to (R ln. to ft ln. to (R ln. to ft ln. to (R ln. to ft ln. to (R ln. to ln. to (R ln. to ln. to ln. to (R ln. to ln. to ln. to (R ln. to ln. to ln. to (R ln. to ln. to ln. to (R ln. to ln. to ln. to ln. to (R ln. to
	-		 		Wasser Steel non n. o n.
			 		Set/Gaste O.O. Length 15.0 Set between 2060 R. and 560 R.
					R. end R.
		<u> </u>			5.63 1 States Date Date Managed 1/2/3
					10. PUMPING LEVEL (below lead surface)
					ft. ofter
			ĺ		16. WELL NEAD COMPLETION - (Priloss adapter, manufacturer
					2 Basement offset 3 At least IF above grade 12 WELL OROUTED?
					oren marrie bluttinite oren 4 2 0.00 vo
					IN NEARBST SOURCES OF POSSIBLE CONTAMINATION LLC feet Streeties type
					Well distributed upon completes ? Yes□ My S1c. 3
					Date Installed
					Model Humber
					Material of drop page
		<u> </u>			Type: 1 Schwerzite 1 L. S. Terblee 5 Rectpressions
IS REMARKS, ELEVATION, SOURCE OF DATA, etc.	short, If sended	L	L		16. WATER WELL CONTRACTOR'S CERTIFICATION This wall was defined under any jurisdictions and this report is true to
Selt Spoon 8	ample (olleet	ted		the best of my houseless and bellef.
1 7.000	ſ	-			License Business Name License No.
					A48****
					SteadDeta
					Authorized Representative
IMPORTAL FILE WITH DEED - WELL	NT:	1	94	792	Name of Drilles

County Name	PIAIF	OF MINNESSIA		RWELL	RECORD for Mener Sample 194793
Trimaka Name Trimaka Husah	"G " = " = 1	Section No. 100	700	Summer 15	1. PROPERTY OWNER'S HAME
1 Intence and Directions from Road Intersections or Street Address	u and Cuy of West Carolles	<u> </u>	<u> </u>	. <u>/W</u>	Air National Guard
Air National O	mand bo	<u>z, D</u>	W	h M tecation.	Down, MN 55811
	Linn Name			T	17.0 . 11/26/86
W	A	DPD	0		5-1 Colds tool 4 Revene 7 Driven 10 Day 3 Hollow red 5 Air 9 Bored 11
	W	Store	<u> </u>		3 Mindlew red
; <u> </u>	Number	140			& USE t□ Demonts 4□ Public Supply 1□ Industry
\$1 mile	COLON	GW3-A	FROM	10	2Chrispina SCMonicipal BCComparcial
C-14. See J Class		- C.	0	9	7. CASING HEIGHT: Condition HOLE DIAM
Silty Sandy Clay	brown	80/	 - -	<u> </u>	2□Gabr. 5□Weddad SerfaceR.
Clayer Sandy S.1+	brown	808	9	13	30 Plastic of S. Steel Orine Shart Var No. X 222 to to 1210
Sith Sand	more	8017	13	17	
					lo. to lo. to lo. to lo. to lo. to
			 	 	Tree Stairles Steel Dr. 2 in.
		 	<u> </u>		ShifGood 010 Length 10.0
			<u> </u>		Ser between 1605 n. and 6.5 n.
					o. STATE WATER LEVEL 7.6 0.00 hotor □ above Date Measure 1/12/87
			 -		10. PUMPING LEVEL (below land surface)
		<u> </u>			fi. ofter
			<u> </u>		11. WELL HEAD COMPLETION 1 Plaines subspar, measufacturer model
					2 Description office 3 At least 12" above grade 12 WELL OROUTED?
	· · · · · · · · · · · · · · · · · · ·				XVn □No
			 		When commercial attendance to
		 	 -		heat-cenut 3 0
			<u> </u>		13. NEAREST SQUIRCES OF POSSIBLE CONTAMINATION
			1		N_30 feet NW direction CANDONN type Well disinfected upon completion? Yest Nath Site 3
		 	 		14. PUMP
1		 	 		Dute translated
	·		<u> </u>		Manufactured's Monte
1	I	i i		1	Length of drop page
]		Motorial of drop pape
		 	 	 	Type: 1 Softwarelife 3 SLE-E-Turbine S Retrievabling 2 Set 4 SC Venerings 6 S
Use a second 13. REMARKS, ELEVATION, SOURCE OF DATA, etc.	short, if southed		<u>L</u>	L	16. WATER WELL CONTRACTOR'S CERTIFICATION This wall was drilled mader my jurisdicates and this report is true to
•	de In	ke			This way was proceed any processors and the report in the second and the base of any knowledge and bellef.
Split Sporn Samp	700	(,			Literate Profession Home Literate Ho.
					Addres
					Signed Authorized Representative
IMPORTANT					Medic of Driller \$75 30M
FILE WITH DEED _ WELL			Q1	793	

County Manner St Lovis				R WELL (, to a contract 1 , 1 and 1 , 1 and 1
Township None	9 5	36 8	time	w se	Treticel Air Command
Air National One	and Broo	72	المريا	 L	Taluth, MN 55811
Show exact incation of well in writing grid with "X."	Histor Name	11 7	Ch map of w	all location.	4. WELL DEFTH (completed) 20:0 11/22/86
W	1	100 m	4 \ مح \لخ	w5C -	5-1 Colle tend 4 Revene 10 Day
				1	
			(Oran)	/ .	4. USE
S 1 miles	COLON	HARINIES OF	FROM	TO	3□ brigation S□ Municipal S□ Communical DEFect West 6□ Air Condignating 9□
City Sand	brown	86/4	0	6	7/EASING NESCHT (Aphilibidory MOLE DIAM
March Silt	red-brown	80/7	6	10	2 Cade. S Wedded Surface 4 C
Cod (10 Silt	pronn	8.17	10	20	7_ n. n. 23 n. n. 22 n. 22 n. n. 22 n. n. 22 n. n. 22 n. n. 22 n. n. 22 n. n. 22 n. n. 22 n. n. 22 n. n. 22 n. n. 22 n.
Samuy Caly 1717	Digo	00 17			in. to
					Hote
					Bot/Gouse Ot O Longit 15 ##
				ļ	TI. and TI. TI. and TI. TI. and TI.
			············		5.45 Objecting Date Measured 1/12/87
					10. PUMPING LEVEL (below lend surface) St. ofter
	-				ft. ofter
					1 Pitiose adapter, manufacturer
					Yn □No
					Grow muserus Destroy on 4 12 n. On You
					West comet Z O
	·				13. NEARBET BOUNCES OF POSSIBLE CONTAMINATION 35 feet STE direction DIAMSTARTY
				<u> </u>	Well distributed upon completion? Yes Myst 517e-5
				<u> </u>	Door toolafford A Not tourshired
				<u> </u>	Monufactional's Modiles
					Length of drop pipe
					Material of drop pape Type: 1□Submersible J□LuS. Turbbe S□Hartpraceling
	abort, Massaid				16. WATER WELL CONTRACTOR'S CERTIFICATION
SALL SAGE	amale	12 1	'n		This well was defined under my herbifection and this report is true to the best of my knowledge and bellef.
Split Spoon S			•		Licenses Dustricts Home License Ma.
					Address
					Signed Date Date
					Date
IMPORTAN FILE WITH DEED - WELL	IT: OWNER COI	y 1	94	794 1-14	Nome of Driller HE-01908-01

Crossing Radius St. Lais				R WELL I	RECORD SON SON SON SON 194795
Torontop Huma	15 g	36 5		N'SE	Tactical Ar Command
Air Matimal Cha	of Base	Dusk	h		Duch M 55811
Show exact bacation of well in section grid with "X."	the Name	1 /	10 may of -	oli facation.	4. WELL DETTY (completed) 10.0 11/71/86
W		1 Form	<u> </u>	-	5. (Chie tool 4 Revene 7 Drives 10 Dag
	N 3	//	@).		2 Hollow red 5 Air 5 Bared 1
		/	GV	- 15 B	6. USE
1. PORMATION LOG	COLOR	HANDWEST OF	FROM	· 10	2 Irrigorium S Municipal g Communicial Di Tree Well 6 Air Conditionium 9 1. CASING NEEGHT! & Sovetibeles HOLE DIAM
Gaudy Sand	prom	80/7	0	3.5	Il-Black AThresded O. S.
Sundy alexer Silt	brown	50/7	3.5	8	10 Colo. SU Wedde Surface - R. 10 Plastic ST. Start One Sheet You - No X
Sity Sand	branch	Soft	8	13	1 10 10 10 10 10 10 10 10 10 10 10 10 10
Gravely Sand	brown	med	(3	16	
		ļ <u> </u>			Type Strale Stel on Zin
1		 	 		Stot/Goods 6.01 Length 51TTINGS:
		 			1. STATIC WATER LEVEL
				 -	5.63 (1) Defens Date Measured 1/12/87 10. PUMPING LEVEL (balod land series)
					ft. ofter brs. pumping
				<u> </u>	II. WELL NEAD COMPLETION □ Prices adapter, management
					3 □ Basement office 3 □ At total IF above grads 18. WELL OROUTED?
					ment cent 1-a 0
ļ					13. NEAREST SOURCES OF POSSIBLE CONTAMINATION
					W direction W Struction Williams Company Compa
					14. PUMP
					Cook backfield Hot backfield
					Medel Humber HP Velta
·					Length of drop pips R. sepectry R. sepectry South
					Type: (Submercible 3 CL.S. Turbbo 5 Restpressing 2 Jet 4 Crossingd 0
IS REMARKS. SLEVATION, SOURCE OF DATA, 665.	sheet, If needed			L	16. WATER WELL CONTRACTOR'S CERTIFICATION This well was defined under any jurisdiction and this report is true to
1 Split Spor S	imples	take	1.		the best of my knowledge and belief.
1	•				Electron Bushesti Namo Electron Mo.
1					Signed Authorized Representative
IMPORTANT FILE WITH DEED - WELL	: OWNER COP	y 1	947	795	Nume of Ordina Pro-

LINEATION OF WELL	SIAIL OF MINE		RWELL	RECORD	MINNESOTA UNIQUE WE for Weter Sample	LL NO.	194796
Township Name Str. LOVIS	Section No.	Minner Traction	L an s	A.OI.M	HER'S NAME		
Patance and Descrime from Koad Intersections or Street Adde	4 15 3 3k	> 5W Y	MSE"	Tac	cticel	Air	Command
Air National qua	a Base, De	wth		Peh	th, MN	5	5811
A**	·	/~_	ott becation.	22	. D	Dete	11/21/86
W		Suntar V	,	S. 2 Cabby band	4 Revens	7C Ortos	10 Day
March 1	1/4/4		₽	2 Hollow rad	S□Alr 6□Jensed	o C Served	··□
	- 1 8/6	NSA- C	T	& USE		Source years	
				1⊡inmente 3⊡irrigajian		while Supply funicipal	1□ Industry 8□Cresswortel
Classical Scales		ATION FROM	10	1. CABING	U HE	dr Creedingsing	+C) HOLE DIAM
cayer 5, try sua	prom 80)	40	105	I□Stock 2□Galv.	S Waded St	2.4	8
Silty Sand	many 20	1105	12	s□ Plastic	System	m Short Yes	- "× 15.3 22
Gavely Sitty Sand	brown (s)	4/2	18.5		·	Weight	
Sill Sand	boom sox	7-185	22	A. SCREEN	<u> </u>	Welgha	R
7.11	- of the or in the	7 1.00		Tun Star	irlan Ste	<u> </u>	7- in
				Sot/Gener	0.01		15-F7-
				Set between	h.ml	n.	
				9. STATIC WATER I	LEVEL OA		1/12/87
				IO. PUMPING LEVE			
		_			ft. sifter	_ hrs. postplag _ _ hrs. postplag _	
				11. WELL HEAD CO			•4
				12. WELL OROUTES		ant II' above grade	
		[[1	. / 5	ØV- □No	_	
				Orena marrial	thit .	4.1	1.9 a a va
				VOV	+ ahrt	19	<u> </u>
		·		12 NEAREST SOUR	CES OF POSSIBLE CON	-	MARAMAN
					, fortE upon complexion?		Site 5
· ·			ſ	14. PUMP		-	
				Dute Installed		- 8	Paralled .
				Manufactural's Man	<u></u>		P Velte
				Length of drop plo		R. cape	mr
				Staterial of drop pa Type: (OSubm	ACT.	S. Turbine	s Continuesting
Uto a second of	mat, 1/ armand		ļ	3□ Jos 16. WATER WELL CO	4Des	ATION	
IA REMARKS, ELEVATION, SOURCE OF DATA, MA.		la		This was	I was drilled under my furb of my knowledge and belie	distinct and this rep	un b ann 10
Split Spor San	yles Ta	cu	1				
	•		}		Licenses 8	usining Hame	Liumin Ho.
			}	Address .			
				Signed	Authoritord	Representative	
***					Nome of D	r@ler	
IMPORTANT	T:	1947	961				

CHANGE HELDES		OF MINNESOTA	WATER	RWELL F	IECORD for Noter Sample 194797
	9 15	1 50	tine?	r pw	Tachcal Ar Command
Durance and Herection from Hond Intersections or Street Adde	and City of Wat Carellion	DUSH		. <u></u>	Dut, MN 55811
Show exact inception of well in vertical grid with "A.)	a conse		<u> </u>	il Incelion.	4. WELL DEPTH (completed) (5.0 Dute of Completion 11/24/86
	Hitaa Paris				5: t□Cubic tool 4□Revors 1□Drives 10□Dag
W	it Humber	(land	an B	9	2○theRone read S□Abr &□Segred t0□
	(Number	(ļ		3 USE
		方之		Į.	1 ☐ Themsetic 4 ☐ Public Supply 1 ☐ Industry 2 ☐ Inrigation 5 ☐ Municipal a ☐ Communicial
2. PORMATION LOG	coLOR	TONING TO	HOM	70	ADT FOR WIRE 6 AD Conditioning 4
Silty Clayer Sand	brown	2084	0	+	10 Black statement surface 2.53 R.
Gravely Sand	red-trown	887	7	13	10 Plastic at 5. Stell Ories Sheet You - No de 15.3 to 50
Silty Sand	bran	Soft	13	5	
		: 		٠	
					Type Status Stal on 2"
					Ser Joseph Co Margin Co Ma
					n. static water Level
					1.96 published parties Date Messared 1/12/87
					10. PURFING LEVEL (seess take surset) ft. ofter brs. pumping
					11. WELL HEAD COMPLETION
					1 Phloso adapter, manufacturer
					12 WELL OROUTED?
		•		-	Street Comercial CAP 3 Sectionals 30
					best cent 2 0
					LE NEAREST BOURCES OF POSSIBLE CONTAMINATION 20 fort NE direction DUNATION type
					Well dissolvered upon completion? Veil My Site 7
·		:			14. PUMP
					Door tonselled Direct tonselled
					Monofesteret's Home Model Musebut
					Leagth of drop pipe
					Type: 1 Submerville JCL 8. Turbbe SC Rectamoroling
Use a second IS. REMARKS, BLEVATION, SOURCE OF DATA, etc.	about, If acceded				14. WATER WELL CONTRACTOR'S CERTIFICATION
Split Soon san	mpls to	cky.			This well was defined under stry jurisdiction and this report is true to the best of my knowledge and bellef.
7 , 700	1	••			Licenses Business Home Literate Ma.
	•	•			Address
					Signed
					Authorized Representative
IMPORTANT		, 1	9/17	797	Note of Driller View of Driller 1/10 200
ETS MUN SEED - METT	OWNER COPY		<u> </u>	79 7	ME-01806-01 3/46 1996 7

CHARLES St. Lais	SIAIEU	A SUCCIONISM			RECORD SON MINNESOTA UNIQUE WELL NO. 194798
Toronto, Hone 50	Hanse Hombar	1 5	EW	4-W+	Tactices AN Command
AN National Gu	and borse	→	rh	th,	Diwt, IW 55811
	Number	J-CN7	B	di because.	4. WELL DEPTH (completed) ZO, O 1. N/23/86 5. (C) Cohe total 4 Revery 10 Orders 10 Dags
	- (land?			2 Hotory end 5 Air 5 Bared 1
1 at le PORMATION LOG	COLOR	VARIATION OF	FROM	10	3
Clayer 5:1+	brown	Soft	0	/	10 Start 47 Property Surface 276 1.
Sandy Silt	red-overings	8/17	1	3.5	10 Plastic ST S. Sheel Oring Sheet VII _ No. 4 153 m. 200.
Sity Gravely Sand	brown	Soft	35	13	
Govely Sand	bon	Soft	B	20	8. SCREUN Or open hole to 1. 10
		_			Top Staining Fact on 2 15 15
					Set between 19,8 n. and 48 n.
					4.77 posture Date Date Date Manage 1/12/67
					10. PUMPING LEVEL (below land surface)
					ft. efter
					T1. WELL HEAD COMPLETION 1 Prices adapter, manufacturer 2 Bearmont offset 3 At least 18" above grade
					12 WELL OROUTED?
					ATHOR COMMON CAR ATTENDED ST.
					hart ant 20
					15. HEAREST SOUNCES OF POSSESSE CONTAMINATION 75 foot Well disinfected upon completing? Vel Vel Vel Vel Vel Vel Vel Vel
·					14. PUMP
					Oper installed
					Model Humber
					Leapth of drup pipe ft. especity
					Type: ICSobarroods ICLE Torbin SCharlementing
IS. REMARKS, ELEVATION, SOURCE OF DATA, on					16. WATER WELL CONTRACTOR'S CERTIFICATION This well was defined under my jurisdiction and this report is time to
Split Spoon S	noples	Tak	en		the best of my beautistips and belled. Livenier Business Home Livenier the.
					Mm
					Signed Dett
					Authorized Representative
IMPORTAN FILE WITH DEED - WELL	T: OWNER COPY	, 1	947	'98 -18	Nume of Dellar HE-01995-01

County Heart ST CL CAN CONTROL	* · · · · · · · · · · · · · · · · · · ·			WELL F	
60	B Logi Humber	Sections Mo. Fract		"NW	Defice Ar Command
Air National & gran	L Blose	Dud	h	l for seize	- Tolota, MN 55811
Show exact lectation of well in section gold with the section and well as section and well as section and well as section and the section and	Hiss Name				19.0 11/23/86
W - 19 - 1 - 1 - 1 - 1		(pardfi	11 B		5: Color tool 4 Revenue 7 Deben 20 Dag
 	Name /		\e	94A	2 Hellens red 5 Ale 5 Based 11
[b]	1 Humber		大	+	& USE
1 1 1 1 1 1 1			B	(I □ Chamentic 4 □ Public Sopphy 1 □ Industry 2 □ Integrina 5 □ Monicipal 6 □ Chamentul
2. FORMATION LOG	COLON	MARINA PROP	FROM	10	3) Cor Well 6 Ar Conditioning 0
Clarer Silt	brown	50/4	Ó	6	5□Stack 9□Threeded 3□Gair. 5□Wedded Surface 2.77 8.
Gravely Sand	brown	8081	6	8	10 Plastic of Stal Orine Shart You Next 23 to 19 Pl.
Silty Sand	monn	8087	8	19	
					A. SCREEN Or open hole
		1			Stanley Steel 7 Zin
		 		:	Bor/Cause OL O Longth DYPTINGS:
					Set between ft. and ft.
					3.89 (1) Defense above Date Measured 1/12/87
` <u></u>					10 PUMPING LEVEL (below load surface)
<u> </u>					ft. ofter hrs. pumpingsp.di.
					11. WELL HEAD COMPLETION
					Piclose adapter, manufacturer
					IZ WELL GROUTED?
					ATTHEN COMMON ATT AND ADDRESS SEE
					Orma marrie Blatton 1 + 1 mm 6 4 0 n. Oz Va.
					heat com 7 0
					IL NEAREST COURCES OF POSSIBLE CONTAMINATION N 150 fort
					13. NEAREST SOURCES OF POSSIBLE CONTAMINATION 1. 150 fort Wed dissificated upon completion? Vel. 11. 5.7.6.7.
1			Ì		14. POMP
					Date installed
					Monofactored's Name Usedel Number
		 			Length of drop pipe ft. capacity
L					teneral of drop pape Type: (□Sohmership 3□L.S. Turbino s□Hestpretelling
					3□Jet 4□Cvoorthyad 4□
IA REMARKS. ELEVATION, SOURCE OF DATA, etc.	shoot, if model	<u> </u>			16. WATER WELL CONTRACTOR'S CERTIFICATION This well was defined ander any jurisdiction and this report is true to
Split Spor So	emples -	takn.			the best of my hooveledge and bellef.
:' (ı			ļ	Licenses Business Home License Ha.
1					Address
.					SignedData
					Authorized Representative
IMPORTAN'	T:		047		Nome of Driller Prince See See See See See See See See See S
FILE WITH DEED - WELL	OWNER COP	Y 11	<u>94 /</u>	<u>99]</u> -19	HE-01808-01

Circulary Name St. Lovis		,		R WELL (RECORD for Meter Sample 194800
Trivitality Huma Trivitality Hum	150	36 W	W'W	VSE"	1. PROPERTY OWNERS MANE TO CHELL AN Command
AN National Cha	of base	Dul	th	:	Polote, UN 53811
Show exact location of well to section gold with "X."	Hum Name	She	100 map of w	ell focusion.	2500 Deter of Completion
W -: -: -: E					5. CCable total 4CReverse 1CDriven 16CDeg
	1 8	1 3	o.		3 Hadero end 6 Air 6 Served 1 0
	Number	4	/I−E		USE I□Demonte 4□Poblic Supply 1□ Industry
1. PORMATION LOG	COLOR	HANNING P		то	2 Integration 5 Interest 2 Commercial 20 True Well c Air Congress 7. CASING MERCHY, Absorbitory MOS PAAM
Silty Clay	prom	Soft	0	2	1 Buch a Threaded
ages Silf	red-brown	Soft	2	13	20 Cat. 50 Washed Surface 21 7 0. 20 Plantic 125, Starl Drim Start Va _ No _
Sitty Gravely Clay	brown	Can-	13	23	1 2 m m m
	greenbrown	C1 11-	12	25	6. 50 REEN Or open held in. to
ring sama	of a proun	8.15	12	03	Tro Starten Steel on Zin
					Ben/Course
					R. and
					1. STATIC VATER LEVEL 1. Static VATER LEVEL
					10. PURPINC LEVEL (below land surface) ft. ofter her, pumping
-					n. ofter hr. pemping
					Pitter ofspie, mantarrere
					12 WELL GROUTED?
					Green accounts Less ton it & one B . G . Co Ya
					combat. 6 2 heat appert 2 0
					IS. NEAREST SQUINCES OF POSSIBLE CONTAMINATION N 15 0 fort Greation Well dissinferted upon completion? Veril Ingle 14. FUMP
					Door installed Het installed
					Head NumberW
					Longits of drop pipe
					Type: 1 Substantials 2 L.S. Turbles 1 Statementing 2 Set 4 Scientings 6
Use a sessed of IA. REMARKS, ELEVATION, SOURCE OF DATA, sec.		1			16. WATER WELL CONTRACTOR'S CERTIFICATION This wall was defined under any jurisdiction and this report is true to
Split Spoon San	uples -	Talen	ı	}	the base of my honorhodge and bellef.
• •	· ·			ł	Literate Business Name Literate Ma.
)	**************************************
				Ì	Signed Authorized Representative
IMPORTAN		1,			Nume of Dritter Syrs 304
FILE WITH DEED - WELL	OWNER COP	v 11	948	300 L	

Crossity Master St Lovis			R WELL I	
Township Name Township Num	15 \$ 36	NIA LIV	rse.	1. PROPERTY OWNERS HAME Tactical Air Command
That sace and Tracetion from Based Intersections or Sever Adde	us and City of West Cartilles	- 1 S	7	Duth, MN 55811
Show exact incession of well in section grid with "X."	are base	Shotch map of w	of location.	4. WELL DEFTH (completed) Date of Completion
		~		16.5 n. 11/20/8C
	Human	Pond		2 Hollow rad S Abr S Sand (10
	1 2		+	3 Natory 6 Sectod France Auger 6. USE
		G	W1-8	
2. FORMATION LOG	COLOR MARINE	KOM FROM	10	Tree Well 6 Air Creditioning C
Sity Clay	brown 88	10	3	10 Back Affronded 30 Gain. 50 Westerd Surface 1.94 a.
Sitty Gravele Clas	brown Soft	- 3	16.6	30 Plastic of Start Date Short Va - No. 1/5
				10. 10 C S R. Weight
		 -		E SCREEN Or open halfs Let 40
				Make no no no no no no no no no no no no no
			<u> </u>	Selfcose O.O Leegth 10 Ft
				Set between 10:5 n. and 11.7 n.
				9. STATIC WATER LEVEL 13.22 1 Same Day Day Managed 1/12/87
				10. PUMPING LEVEL (below land surface)
\				11. WELL HEAD COMPLETION 1 Philoso sdeptor, manufactorer
				2 Second office 3 At least IF above grade 12. WELL OROUTED?
				Non Comen CAT 20 Sections 20
				Cross sources behitraite on 6 " 4 a ca va
				heat cement 2 0
			 	13. NEAREST SOURCES OF POSSIBLE CONTAMINATION
				Well disinfected upon completion? Yes New Grove Day
				14. PUMP
				Date installed Not installed
				Model Number NP Velta
	 	_	 	Length of drop pipe
				Type: (C)Submirities 3CL& Turbine SC Restgencing
Use a second 15. REMARKS, ELEVATION, SOURCE OF DATA, etc.	short, if product		<u> </u>	16. WATER WELL CONTRACTOR'S CERTIFICATION
1	· 1	_		This well was defined under my jurisdiction and this report in true to the best of my hamminian and build.
Split Spoon Sa	my week	λ.		Electrone Business Name Lierens No.
				Address
				Authorized Representative
IMPORTAN	 T:	404	000	Number of Definer
FILE WITH DEED - WELL	OWNER COPY	1948	80 9	海電

Company Marine St Loris	3,2,1 3,1 3,1,1,1	WATERW	LL RECORD SON WENT Sample 194810
Trovaship Name Township Num	Nage Humber Section No.	. Fraction	E Tachcal Air Commad
Ontange and Direction from Read Interactions or Server Adde	THE AND CHIT OF WHIT LOCATION	- WYY NW -	Adding
Air National gha	of Brand or	States may of well be	TOUR, MN 55811
	Million Physics .	6WIE	17.5 . 11/19/86
W E E	n Museum		5-10Cohie tool 40Reverse 70Drives t60Dug
	1/ 1/2	/ bouge	
	t Humber		6_USE (Disease) 10 Industry
S 1 mCLs	COTON JUNION	IATON PROM	2□lerication S□Monicipal d□Commercial
CIV OLA	,		7: CASING HEIGHT: SO L'Edow HOLE DIAM
3/14 clay	1		20Gdr. SO Wolded Surface 3.22 n.
Clayer Silt	prour 8ed	1- 3.5 9	5 All Plastic abs. Steel Drive Short You - No X 13 11 17 11
Gravely Sand	brown So	17-9.5 1	3
Clara Silt	brown so	8413 17	
June 1		<u> </u>	Type Stair Lon Steel on Zin
	-		Stor/Course G.O Length O 17-
			Set between 11. 1. and 12. 1.
			4.32 Notes Color Date Date Date Date Date Date Manual 1/12/87
			10. PUMPING LEVEL (below land surface)
			ft. ofterber. pumping
			11. WELL HEAD COMPLETION
			2 Basement offset 3 At least IF shows grade 15. WELL GROUTED?
			d'yn DNo
			Orosa material bletonite ora 65 to 4.5 n.cu You
			- wast am 4.5 0 -
		_ _	11. NEAREST SOURCES OF POSSIBLE CONTAMINATION
			N-100 foot 5 mercion unture type Well dissolved upon completion? Yell that gothe Day /
			14. PUMP
		_	Duce installed The installed
			Medial Number NP Value
			Longit of drop plos
			Material of drop page
· ·	short, if seeded		2 to 4 Crossings 6
19. REMARKS, ELEVATION, SOURCE OF DATA, etc.		ll.	16. WATER WELL CONTRACTOR'S CERTIFICATION This well was defined under my particulation and sinh report is true to
Split spoon som	yh toku.		the best of my knowledge and balleri.
•	L		Edvenore Dustriero Harrie Edvenore His.
			Address
			Signed Date Date Date Date Date Date Date Date Date Date Date Date Date Date Date Date Date DateDate
			Does
IMPORTAL	NT:	19481	Number of Definer

Cingnity Name Sh. Lowis		•		R WELL F	44.01.00 154011
Township Name Foundation Humb	15	36 W	E'N	VSE.	Tactical Ar Command
Air National gian	L Bose	Dut	4		Duh, MN 55811
Show exact lucation of well in section grid with "X."	chia Nome	GW	1-A-	di tacesion.	29.0 Date of Completed 29.0 Il 18/86
W	1	10	ب	$\overline{}$	5-1-Color tool 4-Reverse 1-Derives 10-Day
		B / B	20-05		2 Holary all letted parent Apper
	Number	18 -			6. USE 1 Timestic 4 Public Supply 3 Sadustry
2. HORMATION LOG	COTON '	HARITHAND!	FROM	07	2 trigetina 5 Municipal a Communication to the West to the Communication
Silty Clay	brinn	80/3	0	19	7. CARING HEIGHT: AND PROBLEM HOLE DIAM
Sittle Clayer Sond	brown	50/7	19	22	10 Cair. 10 Wadne Sorten a. 10 Plastic 15 5 to Drive Short You No
Mary Sil	pone	80/7	22	291	10. 10
Con 19	•	1 4			L. SCREEN Or open hole
	· · · · · · · · · · · · · · · · · · ·		 		Type Stanken Star on 2 in
					Set between 29 11, and 14 11.
		 		ļ <u>.</u>	n. ond
		 	<u> </u>		11.28 (1 Decimal paper Date Measured 1/12/83) 10. PUMPING LEVEL (below land surface)
ļ					ft. ofter bes. pomplagg.p.m.
					R. ofter hrs. pumping g → di 11. WELL HEAD COMPLETION 1 Philoso despier, manufacturer general medal
					2 Section of the 1 At least 15' above grade
					(\$\forall Ver □No AQNest Comean CAP AQBentomits 3□
					and married boutonite ma 13 1 11 a. a. va
		ļ ———			heat comer 2
					12 NEARBET SOURCES OF POSSIBLE CONTAMINATION N 250 fort SW direction Un Eastern type
	! 				13. NEAREST SOURCES OF POSSIBLE CONTAMINATION 1250 foot SW direction W ERSILL type Well disinfected upon completion? Yes 10 May 987% Day 1
					Date beneated Of New Installed
		ļ			Manufacturel's Name
					Legis of drop pipe
					Hatertal of drep pape Type: (□Suturerable J□L.S. Turbline S□Rectpasselling
Use a record	shoot, if morded				2 In 4 Counting 6 I
IS. REMARKS, ELEVATION, SOURCE OF DATA, etc.		,			This well was defined under my jurisdiction and this separt is tree to the best of my knowledge and belief.
Split Spor San	your t	zen			Licenser Business Name Licenser Mo.
1	·				Mans
				:	SignedOuto
					Authorited Representative
IMPORTANT FILE WITH DEED - WELL	OWNER COP	y 1	948	311	Mome of Ordios Pro San Art San

CHANGE MEEL	SIAIR	OF MINDISKIEV	WATER	WELL	RECORD SON NAMES COTA UNIQUE WELL NO. 194812
Township Name Township Numb	Honge Humber S	ection No. 1 rac		4 Summer 13	TA PROPERTY OFFICE S NAME
Distance and Direction from Read Institutions or Street Adder	715 a	<u> </u>	WSU	NE	
Air National Ohn	ark Bess	Dul	oth		DILLY, MN 55811
Show exact bucotion of wall in vertices grid with "X."	6W2	E	(1 may of m	d incodes.	4. WELL DEPTH (Completed) 10 0 11/17/86
- +		Fix	1		5-10 Cohle seed 4 Revenu 70 Drives 10 Dag
	Number 1		//		20 Hoters rul
	Humber				3© Natury o□Settod 9∰ener Anger
		I Chancels 4-Profit Supply 1- Industry			
2. FORMATION LOG	coros	"VORTHILES OF	FROM	TO	2
Clay bace Gard	brown	80/1	0	125	1. CASHIO HEIGHT (Abdy) Below HOLE DIAM
Colo	ved-brown		5	19	10 Cate. 10 Wated Serter Co. 10 Partic 15 Star Other Start You No. 10
Gravely Sand	VECK- 1000m	8./7	12.5	171	2
·		<u> </u>			
-				}	S. SCREEN Or open hole from
					1,11 Staids Steel on Zin
			<u> </u>		StoryGoods O D Longth DITTONGS:
		<u> </u>			
		1			10.82 Notation Date Managed 1/12/192
					10. PUMPING LEVEL (below land ourface)
		 			R. ofter hrs. pemping 6.00.
					11. WELL NEAD COMPLETION [Plulots adapter, manufacturer
					3 to Bacement office
					Q√n □No
					1) Trest Comen CAY 20 Contracte 30
	 				CAN-ben t 6 2
					L. NEAREST SOURCES OF POSSIBLE CONTAGNATION
					150 for Sarretten Con English Training
					Well districted space completion? You say 194
, , , , , , , , , , , , , , , , , , ,					لد ا
					Date laysafted
					Medial Humber
		 			Length of drop pape
		 			Type: (Cabananity JOLS.Tuttes (Charipmenting
	about, if product				20144 40Creatings 60
IS REMARKS, ELEVATION, SOURCE OF DATA, etc.		1- 10.			This well was delited under my jurisdiction and this report is tree to the best of my innovintes and ballet.
Split spoon so	ingles	TAKE	₹.		
1	,				License Budistin Name License Ma.
					Address
					Signed Date Date
					Date
IMPORTAN		. 1	948	312	Name of Drilles

Granty Rame & Covis			R WELL F	134013 L34013	
Torontop Hame S Covis Torontop Hame Torontop Hame Torontop Hame	Harder Humber Sections (5)	I WSV	ME	Air National grand	
Air National grad &	ase Di	WL BARRAGE	el lecolos	Tut, W 55811	
	Nome .	Fire	X	23.0 . 11/17/86	
N E Black No	<u></u> \	Tarity	CUIZD	5. 4	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<i>\</i>			3 Hotary 6 Setted Manuar Augus	
Lot blue		/(F.T.)		6. USE	
2. FORMATION LOG	coros HV	RINESS OF FROM	10	Tree Well 6 An Creditioning 9	
Silty Clay In	ed-born S	off O	11	(C) Start DST Transferd Surface 1.77 8.	
Clayer Silty Sand	gray S	p/7 11	13.5	10 Plastic at 55 Eal Drive Shart You _ Hart 23 to a Bot	
Sitty Sand	brown 8	0/7/135	20	in. to	
Sith Clan	breva 8	05/20	23		
		<i>v</i>		Try Slain Stal on Zing	
				Sec/Goods Ot O Longth 5777116S: Set between 12:5 11. and 35. 11.	
		-		n. and	
				1/12/07	
				10. PUMPING LEVEL (below lend serfece) ft. after hrs. pumping	
				0. ofter	
				Pittoes edapter, manufacturer	
	 -			12. WELL GROUTED?	
				Ome march bell to cits on 6.5 " 4.5 " a or va	
				Om-bert 4.5 2	
				13. NEAREST SOURCES OF POSSIBLE CONTAMINATION	
				12. NEAREST BOURCES OF POSSIBLE CONTAMINATION 100 fort direction Che Endurage Well dissoluted upon completion? Yell Null Tive Training	
				In type	
				Date installed If the installed	
·	-			Massferture's Home	
				Length of drop pipe ft. capacity 6.00.	
				Type: (Submerable JOLS Turbine (C) Restpenseling	
Use a second about	a, I sended	TO. WATER WELL CONTRACTOR'S CERTIFICATION			
Selit Son Sam	ps tak	This well was defined under my jurisdiction and this report is tree to the best of my knowledge and belief.			
	.		;	Licenser Business Name License No.	
I	•			Address	
1		Signed Authorited Representative Date			
1112422				None of Delice Date	
IMPORTANT: FILE WITH DEED - WELL O	WNER COPY	1948	313	HE-1100-41	

Country Name A Cons	21715			R WELL	
Township Home Township Hun	15		s the	N NE	J. PROPERTY OWNERS NAME
Instance and Theoretian force Road Inscreptions or Server Add	reas and City of Well Location		<u>~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ </u>	<u> </u>	Address
Sand the Million of and in method gold with "X."	mad bes	<u> </u>	iori	nd location.	Drivit, MN 5581) 4. WELL DEPTH (completed). Dute of Completion
	Million Name	(Fire	:)	//	21.5 11/4/86
W - : - : - : - : - E : - : - : - : -	4	Train			5-
	W GW	20-7/			3□ Indany d□Jested pic person Augus
		//4.	`-)		I□thomostic 4□Public Supply 1□ Industry
2. FORMATION LOG	COLOR	TABILITY TO ST	1	70	2 Serigation S Mountained S Continuented
Silty Clay	red-brown	8087	0	0,5	1. CASING HEIGHT: AND HOLE DIAM
Clayer Sith Sand	red brown	8087	0.5	1.0	10 Car. 10 Water Surface
Sith Clas	red-brown	SOVI	10	12	2
5-11- (-1)	Ced - laste	2015	 		
on the same	1	MI	12	18	Make R. to R.
Sandy Clayer Silf	brown	8 X	18	21.5	Story Cours CO Longer Co A
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					10. PUMPING LEVEL (below land surface)
					11. WELL HEAD COMPLETION 1 Phines adapter, manufacturer model
					2 Received offset 3 At least 15° above grade 12 WELL OROUTED7
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					reat and 2 0
					13. NEAREST BOURCES OF POSSIBLE CONTACTION 15.00 fort State Controller Contr
					150 tool Services Child Maryon Wed detailected upon completion? Yes 1 to Five Tranking
					14. PUMP
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Salt som	المملا	This well was delined under any juminormain and their report in west to the best of My basevindge and bellef.			
Split spor s	mpa	Licenser Bushess Home Literate Ma.			
• 1	•				Address
				ļ	SignedDole
				}	Authorized Representative
IMPORTAN	T: OWNER COP	y 1	948	14	Name of Driller

LINCATION OF WELL	STATE OF MINNESOTA	WATER WELL	RECORD Jan Wester Sample 194815
Toronto Numer Toronto Number	Hange Humber Service No. 177	**************************************	J. PROPERTY OWNER'S NAME
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garely Clay	reation soft	70	10 Plastic 105. Str. Community Va - No. 4 53 m. 10 5 m.
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	(Element Brathata Hame Element Ma.
	•		Address
,			SignedDoor
]			Authorized Representative
IMPORTANT:	1	0/015	Name of Orline Page Date Page P
FILE WITH DEED - WELL C	OWNER COPY	94815 I-27	HE-01508-01

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Split Spon	sample	tel	a	}	the best of my happetedge said belief.
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				1	
				}	Signed Authorized Representative
IMPORT FILE WITH DEED - W	ANT:	y 1	948	16	Nome of Driller Nome of Driller NE-01809-01

County Name		OF MINNI SOTA	WATER		RECORD for Water Sample 194820		
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150	15 8	25	= 5N	<u>iye</u>	Aum National Guara.		
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	sheet, if product	<u> </u>			16. WATER WELL CONTRACTOR'S CERTIFICATION		
15. REMARKS, ELEVATION, SOURCE OF DATA, etc.	رملعك	4.			This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.		
Split Spoon Sample	-, -						
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SuperdOnn							
1					Authorized Representative		
141500					Name of Drilles LVA 30M		
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APPENDIX J
REFERENCES

REFERENCES

- Adolphson, D.G., Ruhl, J.F., and Wolf, R.J., 1981, Designation of principal water supply aquifers in Minnesota. Water Resources Investigation 81-51, U.S. Geological Survey and U.S. Environmental Protection Agency,
- Anderson, H.W., Jr., 1986, Hydrogeologic and water quality characteristics of crystalline rock aquifers of Archean and Proterozoic age, Minnesota. Water Resources Investigations Report 86-4033, U.S. Geological Survey, St. Paul, Minnesota.
- Bonnichson, W., 1971, Outcrop map of southern part of Duluth complex and associated Keweenawan rocks, St. Louis and Lake Counties, Minnesota. Miscellaneous Map Series, Map M-11, University of Minnesota, St. Paul.
- Carlson, M.O., MSgt., MANG, Duluth IAP, Minnesota, 1985, Personal communications (May 23 and June 25).
- Engineering-Science, 1982, Installation Restoration Program, Phase I Records Search, Duluth International Airport, Minnesota (USAF Contract No. F08637-80-G0009, Call No. 0012). Engineering-Science, Atlanta, Georgia (March).
- Gunard, K.T., Hess, J.H., Zirbel, J.L., and Cornelius, C.E., 1983, Water resources data, Minnesota, Volume 1: Great Lakes and Souris-Red-Rainy river basins. USGS Water Data Report No. MN-83-1, U.S. Geological Survey, Minnesota Department of Natural Resources, Division of Waters, Minnesota Department of Transportation, and other state, municipal, and federal agencies.
- _____, 1983, Water resources data, Minnesota, Volume 2: upper Mississippi and Missouri river basins. USGS Water Data Report MN-83-2, U.S. Geological Survey.
- Hill, S., K. I. Sawyer AFB, Michigan, 1985, Personal communication (May 23).
- Hobbs, H.C., and Goebel, J.E., 1982, Geologic map of Minnesota Quaternary geology. Minnesota Geologic Survey, State Map Series S-1, University of Minnesota, scale 1:500,000.
- Kanivetsky, R., undated, An appraisal of ground water resources for the new Natural Resources Research Institute in Duluth, Minnesota. University of Minnesota, Physical Planning Office.
- ____, 1978, Hydrogeologic map of Minnesota bedrock hydrogeology. Map S-2, University of Minnesota, St. Paul.
- _____, 1979, Hydrogeologic map of Minnesota quaternary hydrogeology. Map S-3, University of Minnesota, St. Paul.

- Lindholm, G.F., Ericson, D.W., Brounard, W.L., and Hult, M.F., 1979, Water resources of the St. Louis River watershed, northeastern Minnesota. Hydrologic Investigations Atlas HA-586, U.S. Geological Survey and Minnesota Department of Natural Resources, Division of Waters.
- Little, C., HQ TAC, Langley AFB, Virginia, 1985, Personal communication (May 21).
- Manns, J.D., Maj., MANG, Duluth IAP, Minnesota, 1985, Personal communication (May 24).
- Minnesota Department of Health, 1984, Water well construction code 4725.0100.
- Minnesota Pollution Control Agency, 1985, Letter to Capt. D. Bradford, USAF, Director, Environmental Planning Division, AFESC, signed by T. J. Kalitowski, Executive Director (January 30).
- Moghissi, A.A., et al., 1978, Radioactivity in consumer products. NUREG/CP-0001.
- Public Health Service, U.S. Department of Health, Education and Welfare, 1970, Radiological health handbook. HEW/PHS, Rockville, Maryland.
- Rogers, J.E., 1962, Reconnaissance of ground water conditions in the Duluth Municipal Airport area, Minnesota. U.S. Geological Survey, St. Paul, Minnesota.
- Roy F. Weston, Inc., 1984, Installation Restoration Program, Final Report, Phase II Stage 1, Problem Confirmation Study, Duluth International Airport, Duluth, Minnesota (USAF Contract No. F33615-80-D-4006, Task Order 0025). Roy F. Weston, Inc., West Chester, Pennsylvania (October).
- Sabel, G.V., and Clark, T.P., 1985, Procedures for ground water monitoring: Minnesota Pollution Control Agency Guidelines. MPCA, Roseville (April).
- Schwartz, G.M., 1949, The geology of the Duluth metropolitan area. Bulletin 33, University of Minnesota and Minnesota Geological Survey.
- Siegel, D.I., and Ericson, D.W., undated, Hydrology and water quality of the copper-nickel study region, northeastern Minnesota. Water Resources Investigations 80-739, U.S. Geological Survey, Minnesota Environmental Quality Board, and Copper-Nickel Study Staff.
- Sims, P.K., and Morey, G.B., 1972, Geology of Minnesota: a centennial volume.
 Minnesota Geological Survey.
- Taylor, R.R., 1963, Geologic map of Duluth and vicinity, St. Louis County, Minnesota, bedrock geology. University of Minnesota Press, Minneapolis.
- ______, 1964, Bedrock geology of Duluth and vicinity, St. Louis County, Minnesota. Geologic Map Series GM-1, University of Minnesota and Minnesota Geological Survey, Minneapolis.

- , 1964, Geology of the Duluth gabbro complex near Duluth, Minnesota.

 Bulletin 44, University of Minnesota and Minnesota Geological Survey,
 Minneapolis.
- Thiel, G.A., 1947, The geology and underground waters of northeastern Minnesota. Bulletin 32, University of Minnesota and Minnesota Geological Survey, Minneapolis.
- Thornbury, W.D., 1965, Regional geomorphology of the United States. John Wiley & Sons, Inc., New York, p. 607.
- U.S. Department of the Interior, Geological Survey, 1975, Duluth Heights quadrangle, Minnesota, St. Louis County. AMS 7577 1 SW Series V872.
- U.S. Environmental Protection Agency, 1983, Field monitoring and sampling of hazardous materials (January).
- , 1985, Letter to Capt. D. Bradford, USAF, Director, Environmental Planning Division, AFESC, signed by J. Plucinski, Remedial Project Manager, Region V (February 6).

WESTEN!

TABLE 4-1
WATER QUALITY RESULTS
FIRE TRAINING AREAS

Well No.	Oil and Grease (mg/l)	TOX (ug/l)	TOC (mg/l)	Nitrates (mg/l)	Temp (C-)	рH	Specific Cond. (umhos-cm)
MW-1	0.19	44.3	35.0	0.48	9	7.08	816
MW-2	0.53	602.6	67.5	0.55	6	7.10	820
MW-3	0.86	81.7	66.2	0.93	9	6.91	1107
MW-4	0.42	15.9	5.6	0.39	5	7.10	574
MW-5	0.75	28.0	44.6	0.35	9	7.40	360
MW-6	0.27	15.4	24.6	0.38	7	7.30	636
MW-7	0.38	126.3	17.0	0.47	7	7.50	657
Detect Limit	. 0.1	5.0	1.0	0.1			

TABLE 4-2

SUMMARY OF WATER QUALITY RESULTS FUEL STORAGE AREA, DIAP SAMPLED 15 NOVEMBER 1983

	TOC (mg/1)	Oil & Grease (mg/l)	Pb (mg/1)	Temp. 1	pH1	Specific L Conductance
Monitoring Wells						
MW~8	49.3	0.36	< .020	° 8	06.9	578
MM-9	70.0	1.46	< .020	5°	7.25	782
MW-10	49.0	49.80	< .020	° 8	7.18	809
MW-11	17.0	< .10	< .020	ဇ	6.55	716
Test Pit 2	140	3240	0.031			
Drainage S-1	<1.0	47.20	< .020			
S-2	20.5	48.00	< .020			
Detection Limits	1.0	.10	< .020			

1 - Determined in the field at time of sampling

SUMMARY OF SURFACE WATER AND BOTTOM SEDIMENT ANALYTICAL DATA GOOSE MISSILE SITE DISPOSAL AREA (Sampled 16 November 1983) TABLE 4-3

	воттом	BOTTOM SOIL SAMPLES		SURFACE WATER SAMPLES	AMPLES	
Sampling	Pestici	Pesticides in Soils	Pestici	Pesticides in Water	T0C	T0X
	(6./6π)	Arochlor-1260 ⁾ (µg/ạ)	0.0.0. µ3/1	Arochlor-1260 ¹ µg/l	l/gm	1/611
_	0.139	0.450	<0.1	<0.1	10.9	12.6
7	0.112	0.070	<0.1	<0.1	8.8	11.0
3	0.092	0.360	<0.1	<0.1	9.7	13.9
4	0.100	1.200	<0.1	<0.1	9.7	5.9
\$	0.001	0.020	:	D R Y		
9	0.215	1.300	. 0.18	0.2	11.5	24.1
7	0.132	0.320	<0.1	<0.1	11.0	16.5
ಹ	0.016	0.080	<0.1	<0.1	8.85	< 5.0
6	0.056	0.160	<0.1	<0.1	10.7	29.1
10	0.001	0.010	:	D R Y	•	:
Ξ	0.001	0.010	:	D R Y		
Detection Limit	0.001	0.010	0.1	0.1	1.0	5.0
NF = Not Found						

pra comprimed deterted in pesticide analysis by EPA Method 608

					TABLE 4- 4	SUMMARY O	MARY OF SOIL CHEMISTRY DPDO STORAGE AREA "C"	SUMMARY OF SOIL CHEMISTRY DATA DPDO STORAGE AREA "C"				
	Depth (in ft.)	Oil and Grease	Chloro- form ug/gm	Trichloro- ethylene ug/gm	1,1,1- Trichloro- ethane ug/gm	Bromodi- chloro- methane ug/gm	Dibromo- chloro- methane ug/gm	Tetra- chloro- ethylene ug/gm	Trans-1,2- Dichloro- ethylene ug/gm	1,2- Dichioro- ethane ug/gm	1,1- Dichloro- ethylene ug/gm	1,1- Dichloro- ethane ug/gm
<u>.</u>	1-2	16,700	0.025	::	0.011	::	::	::	::	::	::	::
C-3	0-1	23,400	0.120	::	::	0.001	::	::	::	::	::	::
€3	0-1	23,400	0.047	::	::	::	::	0.002	::	::	9000	::
4 -5	1-2	35,400	0.315	0.005	0.003	90.00	::	0.001	: :	::	::	::
5-5	0-1	13,400	0.076 0.048	0.210	::	::	::	::	::	::	::	::
9-3	0-1	41,800	0.061	0.002	0.011	: :	::	0.300	: :	::	::	::
(-1	0-1	40,600	0.055	::	::	::	::	::	900-0	::	::	::
e-5	0-1	49,500 16,900	::	::	0.014	: :	0.003	::	: :	::	0.015	::
6-)	0-1	7,325	::	::	::	::	::	0.001	; ;	0.003	0.032	0.012
01-3	0-1	194 161	::	::	::	::	: :	::	0.014	0.003	0.015	0.022
1-5	65	11,000	0.240	0.140	0.001	9:0:0	:	;	0.500	:	;	:
?	65	3,470	0.720	0.020	0.001	900.0	;	:	:	:	•	;
Detection Limits	Detection limits 0.1 Heles minimum detection limi	0.1 etian limi	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001



TABLE 4-5

COMPARISON OF DIAP WATER QUALITY RESULTS WITH APPLICABLE STANDARDS, GUIDELINES AND CRITERIA $^{\rm 1}$

Detected Paramters	Drinking Water Standards Minnesota and Federal	Quality Cri- teria for Water	Monitoring Points Exceeding Stand- ard
TOC	-	-	-
TOX	-	-	-
OIL & GREASE	-	0.01 2	ALL
LEAD	0.05 3	0.05 3	NONE
DDD	-	0.0003	SW-64
NITRATE	10.0	-	NONE
SPECIFIC CONDUCTANCE	1000 5	-	MW-3

¹ mg/l unless otherwise noted.

² Virtually free of oil and grease for domestic water supply.

³ Health related.

⁴ Surface Water sample No. 6, Goose Missile Site Disposal Area.

⁵ u mhos/cm, Wildlife related.

APPENDIX K BIOGRAPHIES OF KEY PERSONNEL

MICHAEL W. ANDER

Title

Senior Environmental Scientist/Associate

Expertise

Environmental Analysis/Impact Assessment

Environmental Auditing

Experience With Firm Conducts and manages hazardous waste contamination studies for industrial and government clients throughout the United States. Joined Dames & Moore in 1973.

Senior Environmental Scientist/Associate

- Environmental audits and risk assessments for several industrial facilities in the Midwest.
- Geohydrologic assessment of a chemically contaminated plant site in Michigan, including evaluation of containment and treatment measures.
- Geohydrologic assessment of a chemical waste disposal facility in Michigan.
- Environmental studies and development of remedial actions for over thirty PCB-contaminated industrial sites throughout the Midwest.
- Environmental analysis and impact assessment report for a 600-megawatt electric coal-fired power plant in Missouri.
- Assessment of the impact to benthic and fish communities generated by the increase of industrial effluent to a river in northern Illinois.
- Land reclamation study for a highly acidic, abandoned coal strip mine in north-central Illinois
- Evaluation of the environmental enhancement resulting from the dredging of polluted sediments from the Little Calumet River in Illinois.
- Study of the economic and environmental implications of developing low-head hydroelectric power on the Fox River in Illinois.
- Environmental assessment of lead in the soils and ground water near a battery reprocessing plant in Illinois.
- Environmental assessment of selected river basins, tributary to the Illinois River, for a statewide stream survey for the Illinois Environmental Protection Agency. Project involved the analysis of nearly 2,000 benthic samples.

Assistant Project Manager

- Environmental baseline studies and impact assessment of copper/zinc mine in northern
 Wisconsin, including analysis and evaluation of fisheries, plankton, and periphitic algae with
 special emphasis on water chemistry and benthis macroinvertebrates.
- Preparation and coordination of final safety analysis report and an environmental report of a nuclear power plant in Missouri.

Principal Investigator/Aquatic Ecologist

- Environmental studies required for the preparation of permit applications and reclamation plans for several coal mines and a coal preparation plant in eastern Kentucky.
- Environmental assessment of dredging an estuary and salt marsh for a chemical plant in South Carolina. Project included an analysis and evaluation of fisheries, plankton, and water chemistry with special emphasis on the collection and analysis of benthic macroinvertebrates.

Project Quality Assurance Coordinator

- Management of numerous projects requiring quality assurance in compliance with Nuclear Regulatory Commission regulations.
- Implementation of Dames & Moore's quality assurance manual on all nuclear-related projects.

Past Experience

Four years experience in aviation electronics.

Aviation Electronics Technican, U.S. Navy (1969-1973)

- Maintenance of electronic systems of A-7 attact aircraft.
- Counselor, Naval Drug Rehabilitation Center.

Academic Background M.S. (1970), biological sciences, and B.S. (1967), biological sciences. Northern Illinois University

Citizenship

United States

Countries Worked In United States

Langugage Proficiency

English

Professional Affiliations

North American Benthological Society; International Oceanographic Foundation: Illinois

Association of Environmental Professionals; Ecological Society of America.

† Ť

Registrations

Certified SCUBA Diver

BEVERLY J. HARPER

Title

Project Ecologist

Expertise

Environmental Analysis and Impact Assessment

Aquatic Ecology

Experience with Firm

Conducts and manages environmental studies and impact assessments for industrial and government clients throughout the United States. Joined Dames & Moore in 1973 and rejoined the firm in 1985 after a 2-year absence.

Principal Investigator/Aquatic Ecologist

- o Evaluation of the environmental enhancement resulting from the dredging of polluted sediments from the Little Calumet River in Illinois.
- o Coordination of environmental baseline studies and impact assessment for a copper/zinc mine in northern Wisconsin.
- o Environmental assessment of potential chemical contamination in the Menominee River, Wisconsin.
- o Environmental site assessments of various sites throughout the country for purposes of acquisition.
- o Assessment of the impact to aquatic communities by the increase of industrial effluent to a river in northern Illinois.
- o Zooplankton specialist with experience in environmental studies in Florida, Maryland, South Carolina, Texas, and Wisconsin.
- o Supervision of the Environmental Laboratory, Park Ridge office. Implemented laboratory quality assurance program.
- Supervision of the analysis of data from several environmental studies.
- o Team leader for various environmental field investigations.
- o Technical reviewer for biology sections for a nuclear power plant biological monitoring study.
- o Biological studies and environmental monitoring for various nuclear power plant projects construction and operating licensing.

Assistant Project Manager

- o Preparation and coordination of Final Safety Analysis and Environmental Reports for a nuclear power plant in Kansas and other nuclear plants nationwide.
- o Environmental baseline studies and impact assessment for a 600-megawatt electric coal-fired power plant in Missouri.
- o Hazardous waste field investigations, feasibility studies, and cleanup strategies for numerous U.S. Air Force facilities throughout the United States.

BEVERLY J. HARPER Page Two

Academic

Background

B.S., Biology, Northern Illinois University, 1971. Coursework completed towards M.S. with emphasis in Ecology,

Northern Illinois University.

Citizenship

United States

Countries

Worked In

United States

Language

Proficiency

English

Professional

Affiliations

North American Benthological Society International Oceanographic Foundation

National Audubon Society

ni-ts

THOMAS E. JENSEN

Title

Senior Geologist/Geophysicist

Expertise

Engineering Geophysics Applied Instrumentation General Geology

Experience With Firm

Principal Investigator

- Seismic investigations to develop engineering properties using combinations of seismic refraction, uphole/downhole, crosshole, surface wave, and ambient motion studies; conducted for nuclear and fossil-fueled power plants, nuclear fuel storage reprocessing and research facilities, fault investigations, and correctional facilities.
- Reconnaissance and feasibility studies for depth of bedrock, bedrock topography, water table, and rippability using seismic refraction methods.

• Evaluation of soil improvement through geophysical testing.

- Geotechnical investigation for water bottom and subsurface conditions for a pipeline river crossing using high resolution reflection, side-scan sonar, and bottom probes.
- Vibration control and attenuation studies of production quarrying and excavation blasting operations; conducted for nuclear power plants, a nuclear fuel processing facility, a petroleum pipeline and sewer interceptor, and residential and commercial structures.
- Vibration monitoring of production and excavation blasting, pile driving, earthwork, and machinery operation.
- Recommendations and performance evaluation of controlled blasting operations for smoothwall excavations.

Borehole geophysical logging.

Electrical resistivity profiling and depth sounding.

• Rock mechanics studies for a longwall coal mining demonstration.

 Geologic and hydrogeologic studies for baseline data to prepare environmental impact assessment and permit applications.

 Structure evaluation by high resolution seismic reflection surveys, test drilling, borehole logging and uphole surveys for a field scale test site for aquifer storage and for compressed air energy storage.

Project Manager

- Preparation of soils, geology, hydrology, and sociocultural baseline reports for an environmental impact assessment.
- Rock mechanics studies for a longwall coal mining demonstration.

Technical Reviewer

- Provide technical review of seismic investigations for nuclear-related projects.
- Review of high resolution marine reflection and refraction surveys.
- Review of test blasting, blast monitoring, and attenuation studies.

Past Experience

Geophysicist, Texaco Incorporated, Houston, Texas and New Orleans, Louisiana

- Involved in interpretation of offshore Gulf of Mexico seismic refraction data.
- Participated in preparation of map packages for lease sales.

Academic Background B.S. and M.S., geology, Northern Illinois University Seminar and workshops on engineering geophysics, Colorado School of Mines

Professional Affiliations Society of Exploration Geophysicists

Registrations

Geophysicist, California

AMY D. LAMBORG

Title

Assistant Geologist

Expertise

Geology, Geohydrology

Experience with Firm

- o Supervised field investigations of several large hydrogeologic/hazardous waste projects for U.S. Air Force. Field efforts included monitor well installation and sampling, soil boring description and sampling, and surface water and surface soil sampling for bases in Fairbanks, Clear, and Anchorage, Alaska and Duluth, Minnesota.
- o Completed geohydrological field investigation at a hazardous waste landfill in Plymouth, Indiana, which included monitor well installation, soil sampling, and slug testing.
- o Performed site assessment at a plastics manufacturing plant in north-central Illinois. Program included collecting composite soil and water samples for analyses.
- o Logged test pits, collected soil and water samples, and installed monitor wells for railroad yards in Chicago, Illinois.
- o Sampled drums of hazardous waste at an industrial site in Elgin, Illinois.

Past Experience

Geologist, Amoco Production Company

- o Evaluated wells for recompletion potential, southeastern New Mexico. Geologist, Wayne Pryor and Associates
 - o Constructed structure and isopach maps for Mississippian formations in south-central Illinois.

Geological Technician, Gulf Oil Company

o Constructed regional cross sections, structure and isopach maps from computer data base for offshore Gulf Coast.

Academic Background

M.S., Geology, University of Cincinnati, 1986. Thesis topic: "Development and Distribution of Primary and Secondary Porosity in the Salem Limestone, South-Central Illinois."

B.A., Geology, Earlham College, 1980

Awards

Amoco Production Company Fellowship, 1983 University Graduate Scholarship, 1982 Teaching Assistantship, 1982

Weber Scholar - Athlete Award, 1980

Countries Worked in

United States Argentina

Language Proficiency

English Spanish

Professional Affiliations

American Association of Petroleum Geologists

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GLENN D. MARTIN

Title

Managing Partner (Ltd.), Chicago Office

Expertise

Waste Management Project Management

Experience with Firm

Waste Management

- o Directed risk assessments for potentially leaking underground storage tanks at 56 sites nationwide. More than 250 tanks containing 18 different products were addressed in the study. Assessments included analyses of hydrogeology, potential contaminant receptors, and the likely behavior of contaminants under a variety of ground water conditions. Program included development of leak response protocols and cleanup protocols.
- o Directed petroleum contamination assessment at an abandoned tank farm in a tidally controlled embayment in Massachusetts.
- Directed remedial investigation/feasibility study (RI/FS) at an abandoned salvage yard in northern Ohio contaminated with PCBs.
- o Directed remedial investigation at coal mine in south-central Illinois contaminated by organic solvents and PCBs.
- o Directed hydrogeological investigations at a sanitary landfill in Kansas City, Kansas.
- o Directed hydrogeological investigation at a sanitary landfill in western Missouri.
- o Directed hydrogeological assessment at the Four County Hazardous Waste Landfill in Fulton County, Indiana.
- o Directed remedial investigation at abandoned railyard in downtown Chicago proposed for commercial/residential development.
- o Directed remedial investigation at active railyard in suburban Chicago.
- o Directed site contamination assessment at oil terminal near Griffith, Indiana.
- o Directed PCP ground water contamination assessment at a wood treatment facility in Wisconsin.
- o Prepared ground water assessment at a proposed coal ash landfill in southwestern Ohio.
- o Directed ground water contamination assessment at an industrial facility in west-central Ohio.
- o Directed ground water contamination assessment at a gray water spray irrigation field in west-central Ohio.

GLENN D. MARTIN Page Two

Other Experience

- o Directed ground water supply studies in Four Mile Creek outwash valley for the City of Oxford, Ohio. Program involved extensive use of test borings, geophysics, and pump tests to identify and confirm the supply potential. Program required public presentation of findings.
- o Directed multiyear, multidisciplinary studies for the Abu Dhabi National Oil Company. Studies entailed extensive field investigations pertaining to marine environment involving more than 30 Dames & Moore professional and support personnel. Studies included development of waste management guidelines for a major industrial complex.

Academic Background

B.A., Geology, University of Cincinnati

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Carol Jean Scholl

Title

Project Geologist

Expertise

Geology Ground-Water Hydrology

Experience With Firm

Provides consultation on geologic and ground-water aspects of the firm's hazardous waste, nuclear and mining projects. Joined Dames & Moore in 1973 and rejoined the firm in 1983.

Project Geologist

- Performed cost-effectiveness analyses of alternate disposal methods for hazardous waste contaminated soils.
- Designed and managed hazardous waste field investigations at U.S. Air Force installations in seven states. The program involved the analysis and evaluation of hazardous materials in soil and ground water including fuels, solvents and trace metals.
- Managed field investigations to assess the environmental impacts of the uncontrolled disposal of heavy metals and industrial wastes in till plain soils.

Staff Geologist

- Planned and managed a hydrogeologic investigation of a waste management facility for a petrochemical firm.
- Performed environmental assessments on the impacts of landfills to the environment.
- Designed and managed a field investigation involving the impact of a chemical process facility on ground water and surface water quality.
- Prepared personnel safety plans for investigations at hazardous waste sites.
- Served as Dames & Moore's group contact coordinator for the Electric Power Research Institute's Seismic Risk Hazard Analysis Program performed in the eastern United States.
- Prepared responses to questions posed by the Nuclear Regulatory Commission concerning faulting studies for a nuclear power plant in southern Indiana.

Assistant Geologist

• Assisted in the compilation and reduction of ground-water data for preliminary safety analysis reports for three potential nuclear power plant sites in Kansas, Missouri and

Illinois.

- Participated in detailed field structural geological studies of a potential nuclear power plant site in Pennsylvania.
- Performed engineering geological duties for a rock coring and soil sampling program at a nuclear power plant site in northwestern Illinois.
- Assisted in the reduction of ground-water data for a hydrologic study of a proposed coal strip mine in eastern Montana.

Past Experience

A total of ten years experience in geology education and research.

Head of Group Programs/Instructor of Geology, Field Museum of Natural History, Chicago

- Supervised professional and clerical staff members of a division of the Department of Education.
- Participated in planning and decisions regarding departmental policies, budgets and procedures.
- Instructed school groups, adult volunteers and other adult groups in geology.
- Trained adult volunteers to present geology tours.
- Supervised a manned exhibit featuring a hands-on environment of natural history specimens.

Graduate Teaching Fellow and Associate/Graduate Teaching Assistant, Miami University, Oxford, Ohio

• Studies course work toward Ph.D., with emphasis on geochemistry and mineralogy.

Academic

M.S. (1970), geology, Miami University, Oxford, Ohio

Background B.S. (1966), geology, Kent State University, Ohio

Citizenship

United States

Countries Worked In United States

Language

English

Proficiency

Professional American Association for the Advancement of Science; Mineralogical Society of America; Affiliations National Water Well Association.

Emp-No: 06046 Vers-No: 01 Date: 06/26/87

BETH J. SCHOEPKE

Title

Assistant Hydrogeologist

Expertise

Hydrogeology Geology

Experience

- o Conducted hydrogeologic survey on waste disposal site in Michigan. Included total ground water discharge to river, contaminant concentrations of discharge, annual loading to river, and final river concentration after dilution.
- o Used pumping test data to determine transmissivity, storativity, and permeability of confined aquifer.
- o Performed resistivity survey for contaminant plume and stratigraphic analysis of waste disposal site in Michigan.
- Analyzed data and prepared a site assessment report for a site in Minnesota.
- o Performed two site assessment investigations on adjacent areas and devised a plan to interface and simplify the data.
- o Mapped the piezometric surface of an area in Duluth, Minnesota.
- o Developed original topographic and geologic maps, as well as stratigraphic columns, for various projects.
- o Performed grain size analysis of soil in the laboratory.

Academic Background Coursework completed toward M.S. with emphasis on Hydrogeology, Northeastern Illinois University B.S., Earth Science, Geology, 1985, Northeastern Illinois University

Seminars

Participated in Dames & Moore Health and Safety Seminar (1987)

Citizenship

United States

Countries Worked In

United States

Language Proficiency

English

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APPENDIX L GEOPHYSICAL TRACINGS

EM SURVEY DATA TABULATION

		E-W	N-S	EW/NS	EU/NS
E−W	N-5	READING	KEADING	AVERAGE	DIFFER.
STATION	STATION	(mmhos/m)	(mmhos/m)	(mmhos/m)	(mmhos/m)
• • • • • • • •	• • • • • • • •	• • • • • • •			• • • • • • •
Ø	Ø	24.00	24.40	24.20	0.40
Ø	-20	24.00	∠+.હહ	24.00	0.00
Ø	-40	24.60	24.20	24.40	0.40
Ø	-60	23.20	23.40	23.30	لاء . ت ا
0	-80	22.40	22.60	22.50	0.20
0	-100	24.80	24.60	24.70	0.20
0	-120	27.20	26,40	26.80	0.80
0	-140	27.40	27.80	27.60	0.40
0	-160	24.40	24.20	24.30	0.20
0	-180	21.20	20.80	21.00	0.40
0	-200	20.80	21.00	20.90	0.20
0	-220	29.60	30.00	29.80	0.40
0	-240	19.80	8.60	14.20	11.20
0	-260	41.60	30.80	36.20	10.80
0	-280	21.40	11.40	16.40	10.00
0	-300	24.00	23.80	23.90	0.20
0	~320	32.40	34.60	33.50	2.20
9	-340	50.80	32.20	41.50	18.60
0	-360	46.00	43.80	44.90	2.20
0	-380	33.60	34.20	33.90	0.60
0	-400	37.80	3.20	20.50	34.60
0	-420	38.80	37.20	38.00	1.60
0	-440	26.40	26.80	26.60	0.40
0	-460	24.80	24.80	24.80	0.00
0	-480	24.80	25.60	25.20	0.80
0	-500	26.20	26.00	26.10	0.20
0	-520	25.80	25.80	25.80	0.00
0	-540	26.80	25.80	26.30	1.00
0	~580	38.40	39.40	38.90	1.00
0	-600	28.60	29.20	28.90	6.00
Ø	-620	26.20	26.00	26.10	0.20
Ø	-640	23.60	23.40	23.50	0.20
0	-660	20.00	19.20	19.00	0.80
0	-680	26.20	26.60	20.40	0.40
9	-700	1.40	14.20	7.80	12.00
20	-700	37.60	30.20	33.90	1.40
20	~680	22.40	21.20	21.80	1.20
20	-660	22.00	22.20	22.10	0.20
20	-640	26.20	26.40	26.30	0.20
20	-620	28.00	27.40	27.70	0.60
20	-600	34.80	54.40	44.60	19.60
20 20	~560 - 540	37.60	12.20	39.90	4.60
20	~540 530	27.00	25.00	26.00	2.00
20	~520 ~520	24.20	24.80	24.50	0.60
20	~500 ~ 180	24.20	23.80	24.00	0.40
20	~480	25.00	24.60	24.80	0.40
20	-460	25.00	25.20	25.10	0.20

20	-440	24.20	22.80	23.50	1.40
20	-420	30.20	32.00	31.40	2.40
20	-400	23.00	4.60	13.80	18.40
20	-380	32.20	33.40	32.00	1.20
20	-360	31.00	ᲙᲧ. ᲬᲧ	30.40	2.00
20	-340	34.00	17.40	25.70	16.60
20	-320	32.40	31.40	31.90	1.60
20	-300	26.20	26.20	26.20	0.00
20	-280	32.80	38.40	35.50	5.60
20	-260	17.60	3.00	10.30	14.60
20	-240	34.60	34.60	34.60	0.00
20	-220	27.60	26.80	27.20	0.80
20	-200	24.40	24.40	24.40	0.00
20	-180	25.60	24.20	24.90	1.40
20	-160	24.80	24.80	24.80	0.00
20	-140	25.80	25.40	25.60	0.40
20	-120	27.20	26.80	27.00	0.40
20	-100	25.00	25.60	25.30	0.60 0.60
20	-80	22.60	22.00	22.30	0.60
20	-60	22.00	21.60	21.80	0.40 0.00
20	-40	23.80	23.80	23.80	0.60
20	-20	24.00	23.40	23.70	0.00
20	0	23.80	23.80	23.80	1.00
40	0	22.80	23.80	23.30 22.50	0.60
40	-20	22.80	22.20	26.40	1.60
40	-40	25.60	27.20	60.60	14.00
40	-60	67.60	53.60	71.60	18.40
40	-80	80.80	62.40 62.20	67.70	11.00
40	-100	73.20	67.00	76.20	18.40
40	-120	85.40	67.00	75.00	15.00
40	-140	83.00	57.00 58.50	72.70	8.20
40	-160	76.80	04.00	p9.20	7.20
40	-700 -190	73.80 75.80	64.00	69.90	11.00
40 40	-200 -220	82.60	66.40	(5.50	14.40
40	-220 -240	78.60	61.40	70.00	17.20
40	-260	55.60	50.80	53.20	4.00
40	-280	21.80	28.00	24.90	6.20
40	-300	31.00	31.00	31.00	0.00
40	-320	31.80	33.00	32.40	1.20
40	-340	57.80	15.60	36.70	42.20
40	-360	32.60	33.20	32.90	0.60
40	-380	27.80	28.00	27.90	0.20
40	-400	44.00	15.40	29.70	28.60
40	-420	40.00	41.80	40.90	1.80
40	-440	24.20	24.20	24.20	0.00
40	-460	22,60	22.80	22.70	0.20
40	-480	23.80	24.00	23.90	0.20
40	-500	24.60	23.80	24.20	0.80
40	-520	24.60	24.60	24.60	0.00
40	-540	27.60	28.00	27.80	0.40
40	-560	29.20	31.00	30.10	1.80
40	-580	216.00	88.60	152.30	127.40
40	-600	32.60	33.80	33.20	1.20
40	-620	33.40	34.00	33.70	0.60
40	-640	40.60	41.20	40.90	0.60

40	-660	172.80	71.20	122.00	101.00
40	-700	30.20	91.00	60.60	60.80
40	-720	14.80	48.80	31.80	34.00
40	-740	34.80	3.00	18.90	31.80
60	-740	36.60	3.80	20.20	32.80
60	-720	26.80	33.40	30.10	6.60
60	-700	18.80	18.60	18.70	0.20
60	-680	30.40	32.20	31.30	1.80
60	-660	79.00	114.80	96.90	35.80
60	-640	168.00	110.80	139.40	57.20
60	-620	91.40	399.40	245.40	308.00
60	-600	206.80	103.60	155.20	103.20
60	-580	57.20	56.20	56.70	1.00
60	-560	38.40	37.00	37.70	1.40
60	-540	30.80	32.80	31.80	2.00
60	-520	27.40	27.40	27.40	0.00
60	-500	28.60	28.80	28.70	0.20
60	-480	27.80	27.80	27.80	0.00
60	-460	26.00	25.80	25.90	0.20
60	-440	27.40	28.40	27.90	1.00
60	-420	19.20	33.80	26.50	14.60
60	-400	45.80	36.40	41.10	9.40
60	-380	23.80	25.00	24.40	1.20
60	-360	31.00	29.00	30.00	2.00
60	-340	114.60	13.60	64.10	101.00
60	-320	34.20	35.40	34.00	1.20
60	-300	34.80	24.00	29.80	וט.טו
60	-280	41.80	48.00	44.90	6.20
ප 0 පල	-280 280	38.80	26.00	32.40	12.00
80 80	-300 -300	42.00	47.60	44.80	5.60
80 80	-320 -340	37.40	45.00	41.20	7.00
80	-340 -360	27.00	21.20	24.10	5.80
80	-380	37.80	38.40	38.10	0.60
80	-400	24.40 41.60	23.00	23.70	1.40
80	-420	48.80	37.60 35.00	39.60 41.90	4.00 13.80
80	-440	28.60	28.00	28.30	0.60
80	-460	27.60	26.40	27.00	1.20
80	-480	28.80	29.20	29.00	0.40
80	-500	39.60	43.40	41.50	3.80
80	-520	64.00	58.80	61.40	5.20
80	-540	157.80	133.20	145.50	24.60
80	-560	263.60	368.20	315.90	104.60
80	-580	225.40	257.80	241.60	32.40
80	-600	76.80	59.00	67.90	17.80
80	-620	38.80	35.80	37.30	3.00
80	-640	29.40	28.80	29.10	0.60
80	-660	32.00	29.30	30.90	2.20
80	-680	27.00	24.60	25.80	2.40
80	-700	19.60	19.80	19.70	0.20
80	-720	19.20	19.20	19.20	0.00
80	-740	20.20	19.80	20.00	0.40
100	-740	20.00	21.00	20.50	1.00
100	-720	19.00	19.00	19.00	0.00
100	-700	21.20	21.60	21.50	0.60
100	-680	24.00	23.6⊎	23.80	0.40
			-		

100	-660	25.20	25.20	25.20	0.00
100	-640	25.60	26.00	25.80	0.40
100	-620	27.80	27.00	27.40	0.80
100	-600	29.40	29.00	29.20	0.40
100	-580	32.60	32.20	32.40	0.40
100	-560	47.20	48.00	47.60	0.80
100	-540	93.00	73.20	83.10	19.80
100	-520	194.20	225.40	209.80	31.20
100	-500	399.20	399.40	399.30	0.20
100	-480	213.40	99.80	156.60	113.60
100	-460	55.40	55.20	55.30	0.20
100	-440	41.80	42.40	42.10	0.60
100	-420	37.40	7.20	22.30	30.20
100	-400	34.40	33.00	33.70	1.40
100	-380	30.00	31.20	30.60	1.20
100	-360	32.80	34.20	33.50	1.40
100	-340	59.60	17.20	38.40	42.40
100	-320	44.00	46.20	45.50	1.40
100	-300	32.00	36.60	34.70	3.00
100	-280	30.00	ವರ.೮0	37.80	2.00
120	-260	35.5V	37.60	30.08	2.00
120	-300	32.00	31.00	31.50	Ø. +Ø
120	-320	41.66	32.40	3 0. 50	ბ. ბს
120	-340	61.60	0.46	34.00	55.20
120	-360	39.20	39.00	27.10	W.ZU
120	-380	36.20	36.80	30.50	Ø.00
120	-400	63.20	62.00	62.60	1.20
120	-420	130.20	114.20	122.20	16.00
120	-440	399.60	399.80	399.70	0.20
120	-460	272.20	389.60	330.90	117.40
120	-480	89.60	55.80	72.70	33.80
120	-500	39.00	38.00	38.50	1.00
120	-520	40.20	39.40	39.80	0.80
120	-54 0	44.60	47.60	46.10	3.00
			39.60	39.00	1.20
120 120	-560 -580	38.40	27.40	27.70	0.60
120		28.00 25.00	24.60	24.80	0.40
	-600 -630			23.30	1.00
120	-620 640	23.80	22.80		
120	-640 660	27.00 25.20	27.00	27.00	0.00
120	-66 0		25.00	25.10	0.20
120	-680	23.80	24.20	24.00	0.40
120	-700	22.20	22.00	22.10	0.20
120	-720	19.20	19.60	19.40	0.40
120	-740	17.60	18.00	17.80	0.40
120	-760	22.20	23.00	22.60	0.80
140	-760	26.60	26.60	26.60	0.00
140	-740	20.20	19.60	19.90	0.60
140	-720	20.80	20.00	20.40	0.80
140	-700	22.00	22.40	22.20	0.40
140	-680	22.80	23.60	23.20	0.80
140	-660	24.80	23.80	24.30	1.00
140	-640	24.40	23.40	23.90	1.00
140	-620	26.00	20.00	20.00	9.09
140	-600	25.20	25.80	25.50	0.60
140	-580	24.40	24.00	24.20	9.40
140	-560	29.20	26.40	27.60	2.80

140	-540	35.20	34.60	34.90	0.60
140	-520	25.60	24.20	24.90	1.40
140	-500	23.20	22.40	22.80	0.80
140	-480	22.80	23.40	23.10	0.60
140	-460	31.60	31.80	31.70	0.20
140	-440	55.80	51.20	53.50	4.60
140	-420	118.60	70.00	94.30	48.60
140	-400	182.80	305.60	244.20	122.80
140	-380	292.80	277.80	285.30	15.00
140	-360	269.00	210.40	239.70	58.60
140	-340	86.00	68.60	77.30	17.40
140	-320	58.80	56.20	57.50	2.60
140	-300	51.00	50.20	50.60	0.80
140	-280	59.00	91.00	60.70	1.80
160	-360	73.20	73.20	73.20	0.00
160	-380	36.80	36.80	36.80	0.00
160	-400	29.00	29.00	29.00	0.00
160	-420 -440	49.80	49.80	49.80	0.00
160 160	-440	49.00	49.00	49.00	0.00
160	-460 -480	27.80	27.80	27.80	0.00
160	-480 -500	19.00	19.00	19.00	0.00
160	-520	22.20	22.20	22.20	0.00
160	-540	23.60 24.40	23.60	23.60	0.00
160	-560	32.20	24.40	24.40	0.00
160	-580	31.00	32.20	32.20	0.00
160	-600	29.60	31.00	31.00	0.00
160	-620	27.40	29.60	29.60	0.00
160	-640	24.80	27.40 24.80	27.40	0.00
160	-660	27.20	27.20	24.80	0.00
160	-680	27.20	27.20	27.20	0.00
160	-700	27.00	27.00	27.20 27.00	0.00
160	-720	28.20	28.20	28.20	0.00
160	-740	27.40	27.40	27.40	0.00 0.00
160	-760	19.40	19.40	19.40	0.00
160	-780	29.00	29.00	29.00	0.00
180	-780	20.20	20.20	20.20	0.00
180	-760	23.60	23.60	23.60	0.00
180	-740	30.40	30.40	30.40	0.00
180	-720	26.60	26.60	26.60	0.00
180	-700	38.80	38.80	38.80	0.00
180	-680	29.00	29.00	29.00	0.00
180	-660	30.40	26.40	26.40	0.00
180	-640	26.40	26.40	26.40	0.00
180	-620	29.20	29.20	29.20	0.00
180	-600	30.80	90.00	98.80	טוי.ט
180	-580	10.80	10.80	10.00	0.00
180	-560	27.40	27.40	27.40	טט.ט
180	-540	23.60	23.60	23.00	0.00
180	-520	23.60	23.60	23.60	0.44
180	-500	23.20	23.20	23.20	טט.ט
180	-480	23.80	23.80	23.80	0.00
180	-460	29.80	29.80	29.80	0.00
180	-440	25.20	25.20	25.20	0.00
180	-420	29.20	29.20	29.20	0.00
180	-400	23.60	23.60	23.60	0.00

				07 00	0.00
180	-380	27.20	27.20	27.20	0.00
180	-360	41.80	41.80	41.80	
200	-380	29.60	29.60	29.60	0.00
200	-400	24.60	24.60	24.60	0.00
200	-420	25.00	25.00	25.00	0.00
200	-440	0.40	Ø.40	0.40	0.00
200	-460	34.80	34.60	34.80	0.00
200	-480	24.00	24.00	24.80	0.00
200	-500	22.20	22.20	22.20	0.00
200	-520	22.20	22.20	22.20	0.00
200	-540	23.60	23.60	∠3.60	0.00
200	-560	∠5.80	25.00	25.00	שטיש
200	-580	28.20	28.20	20.20	שטיט
200	-600	27.40	27.40	27.40	טט.ט
200	-620	27.00	27.00	27.00	0.00
200	-640	28.40	28.40	28.40	0.00
200	-660	30.40	30.40	30.40	0.00
200	-680	33.20	33.20	33.20	0.00
200	-700	30.00	30.00	30.00	0.00
200	-720	34.80	34.80	34.80	0.00
200	-740	26.60	26.60	26.60	0.00
200	-760	22.60	22.60	22.60	0.00
200	-780	19.20	19.20	19.20	0.00
220	-780	23.00	23.00	23.00	0.00
220	-760	24.20	24.20	24.20	0.00
220	-740	26.40	26.40	26.40	0.00
220	-720	28.00	28.00	28.00	0.00
220	-700	30.00	30.00	30.00	0.00
220	-680	36.60	36.60	36.60	0.00
220	-660	4.60	4.60	4.60	0.00
220	-640	35.00	35.00	35.00	0.00
220	-620	25.80	25.80	25.80	0.00
220	-600	26,20	26.20	26.20	0.00
220	-580	28.40	28.40	28.40	0.00
220	-560	25.00	25.00	25.00	0.00
220	-540	24.00	24.00	24.00	0.00
220	-520	22.60	22.60	22.00	0.00
220	-500	24.60	24.60	24.60	0.00
220	-480	24.40	24.40	24.40	0.00
220	-400	46.00	46.00	46.00	0.00
220	-440	24.20	24.20	24.20	6.49
220	-420	23.80	23.80	23.00	טט.ט
220	-400	31.60	31.60	31.00	טט.ט
220	-380	115.80	115.80	115.80	0.00
240	-380	215.40	215.40	215.40	טט.ט
240	-400	40.00	40.00	40.00	0.00
240	-420	23.60	23.60	23.60	0.00
240	~440	30.40	30.40	30.40	0.00
240	~460	64.00	64.00	64.00	0.00
240	-480	24.60	24.60	24.60	0.00
240	~500	23.80	23.80	23.80	0.00
240	-520	20.60	20.60	20.60	0.00
240	~540	22.60	22.60	22.60	0.00
240	~560	23.00	23.00	23.00	0.00
240	-580	23.00	23.00	23.00	0.00
240	-600	23.40	23.40	23.40	0.00
_ ,0	- • •				

240	-620	1.00	1.00	1 1414	0 65
240	-640	35.20		1.00	0.00
240	-660	29.60	35.20 29.60	35.20	0.00
2+0	-680	27.00	27.00	29,60	0.00
240	-700	27.20	21.20	27.00	טט.ט
240	-720	28.40	20.4U	27.20	0.00
240	-740	26.60	20.40	28.40	0.00
240	-760	24.60	24.60	26.60	טט.ט
240	-780	22.60	22.60	24.60	0.00
260	-760	24.00	24.00	22.60	0.00
260	-740	25.00	25.00	24.00	0.00
260	-720	25.80	25.80	25.00 25.80	0.00
260	-700	25.80	25.80		0.00
260	-680	26.60	26.60	25.80	0.00
260	-660	25.40	25.40	26.60	0.00
260	-640	23.00	23.00	25.40	0.00
260	-620	21.60	21.60	23.00	0.30
260	-600	21.80	21.80	21.60	0.00
260	-580	19.60	19.60	21.80	0.00
260	-560	20.60	20.60	19.60	0.00
260	-540	21.00	21.00	20.60	0.00
260	-520	19.00	19.00	21.00	0.00
260	-500	22.40	22.40	19.00	0.00
260	-480	26.40	26.40	22.40	0.00
260	-460	19.20	19.20	26.40	0.00
260	-440	29.40	29.40	19.20	0.00
260	-420	24.20		29.40	0.00
260	-400	36.00	24.20	24.20	0.00
260	-380	399.80	36.00 399.80	36.00	0.00
280	-380	371.00	213.80	399.80	0.00
280	-400	46.40		292.40	157.20
280	-420	25.40	43.00	44.70	3.40
280	-440	28.40	25.80	25.60	0.40
280	-460	16.00	20.20 27.60	28.10	9.20
280	-480	30.00	20.20	21.80	11.60
280	-500	23.80	23.80	29.10	1.00
280	-520	22.80	22.20	23.80	0.00
280	-540	22.80	23.00	22.50	0 · 00
280	-560	23.00	22.40	22.90	0.20
280	-580	23.00	22.80	22.70 22.90	Ø .60
280	-600	21.20	21.40	21.30	0.20
280	-620	22.40	22.60	22.50	0.20
280	-640	24.00	24.20	24.10	0.20
280	-660	25.60	25.80	25.70	0.20
280	-680	26.80	27.00	26.90	0.20
280	-700	28.60	28.40	28.50	0.20
280	-720	25.80	25.60	25.70	0.20
280	-740	12.20	18.20		0.20
300	-720	22.80	23.00	15.20 22.90	6.00
300	-700	24.60	23.40	24.00	0.20
300	-680	26.00	25.40	25.70	1.20
300	-660	21.40	23.40		0.60
300	-640	20.00	21.20	22.40	2.00
300	-620	20.00	20.40	20.60	1.20
300	-600	19.20	19.40	20.20	0.40
300	-580	20.20	19.80	19.30	0.20
			13.00	20.00	0.40

300	-560	19.20	18.80	19.00	Ø.40
300	-540	18.00	18.20	18.10	0.20
300	-520	19.20	19.40	19.30	0.20
300	-500	21.20	21.20	21.20	0.00
300	-480	35.00	32.80	33.90	2.20
300	-460	89.60	12.20	50.90	77.40
300	-440	25.00	25.00	25.00	0.00
300	-420	24.60	25.00	24.80	0.40
300	-400	46.80	41.20	44.00	5.60
300	-380	400.20	219.80	310.00	180.40
320	-380	400.60	400.20	400.40	0.40
320	-400	48,20	44.80	46.50	3.40
320	-420	25.00	25.40	25.20	0.40
320	-440	24.00	24.40	24.20	0.40
320	-460	65.40	55.60	60.50	9.80
320	-480	39.00	42.40	40.70	3.40
320	-500	23,20	23.00	23.10	0.20
320	-520	19.60	20.20	19.90	0.60
320	-540	19.60	19.60	19.60	0.00
320	-560	19.60	20.00	19.80	0.40
320	-580	19.00	19.40	19.20	0.40
320	-600	19.80	20.00	19.90	0.20
320	-620	20.80	20.80	20.80	0.00
320	-640	22.20	21.80	22.00	0.40
320	-660	23.40	23.60	23.50	0.20
320	-680	23.40	∠J.⊌ଏ	23.20	9.40
320	-700	23.UU	22.00	ચેચે∙ છે⊌	11.20
340	-680	21.00	22.00	21.50	1.00
340	-660	21.00	21.40	21.20	이 - 파티
340	-640	20.40	20.20	20.30	0.20
340	-620	19.80	20.20	20.60	0.46
340	-600	19.40	18.80	19.10	N.PA
340	-580	18.60	18.40	18.50	0.20
340	-560	18.80	19.20	19.00	0.40
340	-540	17.80	18.40	18.10	0.60
340	-520	19.60	20.00	19.80	0.40
340	-500	23.40	24.00	23.70	0.60
340	-480	43.20	18.60	30.90	24.60
340	-460	41.20	45.00	43.10	3.80
340	-440	21.60	22.60	22.10	1.00
340	-420	22.80	23.60	23.20	0.80
340	-400	43.80	42.00	42.90	1.80
340	-380	281.20	150.60	215.90	130.60
360	-380	399.20	294.20	346.70	105.00
360	-400	38.40	37.00	37.70	1.40
360	-420	21.80	21.80	21.80	0.00
360	-440	20.00	20.40	20.20	0.40
360	-460	31.40	34.20	32.80	2.80
360	-480	15.00	16.20	15.60	1.20
360	-500	26.60	25.40	26.00	1.20
360	-520	21.00	20.80	20.90	0.20
360	-540	19.00	19.00	19.00	0.00
360	-560	19.00	19.40	19.20	0.40
300	-580	19.80	20.80	19.80	2.00
364	-600	19.80	20.00	20.20	0.00
3 00	-620	20.20	₹ ₽ • ₽₽	∠હા. ∔શ	0.40

360	-640	19.80	19.80	19.80	0.00
360	-660	19.40	20.00	19.70	0.60
360	-680	19.20	19.00	19.10	0.20
380	-660	19.20	20.60	19.90	1.40
380	-640	18.80	19.00	18.90	0.20
380	-620	19.40	19.40	19.40	0.00
380	-600	20.60	20.60	20.60	0.00
380	-580	20.20	19.40	19.80	0.80
380	-560	19.20	19.20	19.20	0.00
380	-540	19.80	20.20	20.00	0.40
380	-520	21.40	21.80	21.60	0.40
380	-500	32.60	32.60	32.60	0.00
380	-480	57.00	6.80	31.90	50.20
380	-460	25.80	25.20	25.50	0.60
380	-440	18.80	19.00	18.90	0.20
380	-420	20.80	20.60	20.70	0.20
380	-400	37.20	36.60	36.90	0.60
380 400	-380	399.20	399.20	399.20	0.00
400	-380	399.00	399.00	399.00	0.00
400	-400	34.00	33.20	33.60	0.80
400 400	-420 -330	19.00	19.00	19.70	0.20
400	-440	10.00	17.00	17.90	0.40
400	-460 -480	23.20	24.20	23.10	1.00
400	-500	56.80	32.60	44.10	24.20
400	-520	36.40 21.60	40.00	38.∠⊍	3.00
400	-540	20.40	21.40	21.50	0.20
400	-560	20.40	20.20	20.30	0.20
400	-580	20.80	20.40	20.40	0.00
400	-600	19.80	20.60	20.70	0.20
400	-620	19.60	20.00	19.90	0.20
400	-640	17.60	19.40 10.80	19.50	0.20
420	-620	18.60	19.00	14.20	6.80
420	-600	19.60	19.20	18.80 19.40	0.40
420	-580	20.20	20.00	20.10	0.40
420	-560	21.60	21.60	21.60	0.20
420	-540	21.20	21.60	21.40	0.00
420	-520	23.80	24.40	24.10	0.40
420	-500	32.40	10.20	21.30	0.60 22.20
420	-480	33.40	32.40	32.90	
420	-460	22.60	22.60	22.60	0.00
420	-440	18.00	18.20	18.10	0.20
420	-420	20.80	20.80	20.80	0.00
420	-400	36.20	36.80	36.50	0.60
420	-380	399.00	399.20	399.10	0.20
440	-380	399.00	399.40	399.20	0.40
440	-400	40.00	38.20	39.10	1.80
440	-420	23.00	21.40	22.20	1.60
440	-440	19.80	19.20	19.50	0.60
440	-460	23.20	23.60	23.40	0.40
440	-480	30.00	32.20	31.50	1.40
440	-500	22.20	2.00	12.40	13.00
440	-520	25.00	27.20	41.00	U.06
440	-540	23.00	23.00	23.00	0.00
710 440	-560	22.60	22.6U	22.10	0.20
440	-580	22.20	21.60	21.90	0.50

440	-600	21.00	20.40	20.70	0.60
460	-600	24.60	23.00	23.80	1.60
460	-580	27.20	27.00	27.10	0.20
460	-560	27.60	27.80	27.70	0.20
460	-540	29.00	28.40	28.70	0.60
460	-520	35.80	37.60	36.70	1.80
460	-500	46.20	6.60	26.40	39.60
460	-480	33.20	35,60	34.40	2.40
460	-460	29.80	30.00	29.90	0.20
460	-440	25.20	26.00	25.60	0.80
460	-420			28.20	0.00
460		28.20	28.20		
	-400	47.20	47.20	47.20	0.00
460	-380	399.20	399.20	399.20	0.00
480	-360	399.∠⊍	399.40	399.30	0. ∠0
480	-400	1 • -+ 6	54.60	20.00	52.60
480	-420	2.20	24.80	13.50	22.00
480	-440	2.20	21.00	11.60	10.00
480	-460	21.00	40.00	31.10	19.00
480	-480	3.40	27.00	15.20	23.60
480	-500	33.40	32.60	33.00	0.80
480	-520	24.60	42.80	33.70	18.20
480	-540	9.60	27.20	18.40	17.60
480	-560	5.00	28.00	16.50	23.00
480	-580	0.80	39.00	19.90	38.20
500	-580	29.40	27.80	28.60	1.60
500	-560	32.40	32.40	32.40	0.00
500	-540	34.80	33.80	34.30	1.00
500	-520	43.80	29.60	36.70	14.20
500	-500	38.40	47.40	42.90	9.00
500	-480	40.60	39.80	40.20	0.80
500	-460	45.80	43.40	44.60	2.40
500	-440	34.40	34.00	34.20	0.40
500	-420	40.00	38.20	39.10	1.80
500	-400	61.20	60.80	61.00	0.40
500	-380	400.20	400.40	400.30	0.20
520	-380	291.20	243.20	267.20	48.00
520	-400	49.00	47.80	48.40	1.20
520	-420	31.60	30.00	30.80	1.60
520	-440	29.00	27.80	28.40	1.20
520	-460	35.40	36.00	35.70	0.60
520	-480	31.60	32.60	32.10	1.00
520	-500	39.20	40.40	39.80	1.20
520	-520	22.60	9.60	16.10	13.00
520	-540	27.40	26.00	21.00	0.80
520	-560	25.20	24.00	25.00	0.40
540	שמכ-	22.60	24.40	23.50	1.00
540	-540	23.20	25.40	24.50	2.20
540	-520	20.00	17.60	10.00	2.41
540	-500	10.60	28.60	19.00	10.00
540	-480	9.60	23.00	16.34	13.40
540	-460		34.20	21.20	
		8.20			26.00
540	-440	7.20	29.00	18.10	21.80
540	-420	12.00	30.20	21.10	18.20
540	-400	24.20	52.80	38.50	28.60
540	-380	401.00	262.80	331.90	138.20
560	-380	400.40	400.40	400.40	0.00

560	-400	41.00	41.60	41.30	0.60
560	-420	25.40	25.20	25.30	0.20
560	-440	23.60	22.00	22.80	1.60
560	-460	29.80	30.80	30.30	1.00
560	-480	25.60	25.40	25.50	0.20
560	-500	27.00	26.00	26.50	1.00
560	-520	25.40	24.40	24.90	1.00
560	-540	24.00	∠⊎.o⊎	22.80	4.00
580	-540	19.00	17.20	10.10	1.00
580	-520	24.00	24.410	24.00	0.00
580	-500	22.20	21.40	21.00	N. PA
580	-420	21.60	22.40	22.00	0.50
580	-460	28.80	29.20	29.00	0.40
580	-440	21.80	21.60	21.70	0.20
580	-420	23.80	23.80	23.80	0.00
580	-400	39.00	40.60	39.80	1.60
580	-380	350.20	109.20	229.70	241.00
580	-360	39.80	40.40	40.10	0.60
580	-340	27.00	26.80	26.90	0.20
580	-320	21.60	21.20	21.40	0.40
580	-300	22.00	21.40	21.70	0.60
580	-280	25.20	24.80	25.00	0.40
580	-260	25.80	25.20	25.50	0.60
580	-240	31.60	30.00	30.80	1.60
580	-220	37.80	33.60	35.70	4.20
580	-200	33.60	33.20	33.40	0.40
580	-180	36.60	10.60	23.60	26.00
580	-160	30.60	30.60	30.60	0.00
580	-140	24.00	23.40	23.70	0.60
580	-120	23.00	22.20	22.60	0.80
580	-100	23.60	13.80	18.70	9.80
580	-80	23.00	23.80	23.40	0.80
580	-60	22.20	21.40	21.80	0.80
580	-40	23.00	22.40	22.70	0.60
580	-20	24.20	24.60	24.40	0.40
580	Ø	24.00	23.60	23.80	0.40
560	Ø	24.40	24.20	24.30	0.20
560	-20	24.80	24.60	24.70	0.20
560	-40	25.40	24.40	24.90	1.00
560	-60	37.60	34.00	35.00	3.60
560	-80	49.60	44.80	41.20	4.80
560	-100	55.60	28.00	41.80	27.60
560	-120	37.40	33.20	35.30	4.20
560	-140	29.20	25.80	27.50	3.40
560	-160	33.20	30.40	31.80	2,80
560	-180	45.00	39.40	42.20	5.60
560	-200	42.60	38.40	40.50	4.20
560	-220	131.40	125.40	128.40	6.00
560	-240	80.60	130.80	105.70	50.20
560	-260 -280	40.60	39.20	39.90	1.40
560 560	-280	32.80	31.20	32.00	1.60
560 560	-300	28.80	28.60	28.70	0.20
560	-320 -346	26.60	25.80	26.20	0.80
560 560	-340 -360	34.00	33.80	33.90	0.20
560	-360	54.40	58.60	56.50	4.20
540	-360	125.20	121.80	123.50	3.40

540	-340	88.80	54.80	71.80	34.00
540	-320	47.20	85.20	66.20	38.00
540	-300	25.00	35.40	30.0D	9.50
240	-280	72.80	50.50	80.60	14.00
540	-260	232.60	116.60	174.60	116.00
600	Ø	26.20	26.40	26.30	0.20
600	-20	6.00	18.60	12.30	12.60
600	-40	21.80	14.80	18.30	7.00
600	-60	21.80	22.00	21.90	0.20
6 00	-80	35.00	24.40	29.70	10.60
600	-100	45.60	27.00	36.30	18.60
600	-120	33.80	43.60	38.70	9.80
600	-140	15.00	23.00	19.00	8.00
600	-160	19.20	29.80	24.50	10.60
600	-180	27.80	9.60	18.70	18.20
600	-200	26.40	40.40	33.40	14.00
600	-220	31.40	31.00	31.20	0.40
600	-240	28.20	27.80	28.00	0.40
600	-260	24.60	24.60	24.60	0.00
600	-280	30.20	33.00	31.60	2.80
6 00	-300	23.80	25.60	24.70	1.80
60 0	-320	24.40	27.00	25.70	2.60
600	-340	30.40	33.20	31.80	2.80
600	-360	37.40	39.80	38.60	2.40
600	-380	227.40	72.20	149.80	155.20
600	-400	48.00	48.00	48.00	0.00
600	-420	29.20	32.40	30.80	3.20
600	-440	28.80	28.80	28.80	0.00
600	-460	33.60	33.00	33.30	0.60
600	-480	26.60	26.40	26.50	0.20
600	-500	21.40	21.20	21.30	0.20
50B	-520	23.60	24.40	24.00	0.80
600	-540	21.20	22.40	21.00	1.20
560	0	25.00	25.00	25.00	0.00
540	Ø	26.20	20.00	20.10	٧٠٧
520	Ø	27.00	25.40	20.70	0.60
500	0	28.00	27.60	27.00	0.40
480	0	28.80	27.80	28.30	1.00
460	0	28.60	28.00	28.30	0.60
440	0	29.80	29.00	29.40	0.80
420	0	29.80	29.20	29.50	0.60
400	0	31.00	30.80	30.90	0.20
380	0	31.60	31.20	31.40	0.40
360	0	42.80	39.80	41.30	3.00
340	0	33.40	33.20	33.30	0.20
320	0	33.60	33.40	33.50	0.20
300	0	33.60	32.80	33.20	0.80
280	0	32.80	32.60	32.70	0.20
260	0	33.40	32.60	33.00	0.80
240	0	33.00	32.60	32.80	0.40
220	0	31.40	30.20	30.80	1.20
200	0	30.60	30.40	30.50	0.20
180	ø	30.20	29.20	29.70	1.00
160	ø	27.00	26.40	26.70	0.60
140	ø	24.80	20.40	22.60	4.40
120	ø	24.80	24.80	24.80	
- 24	v	21.00	₩ T 1 UU	27.00	0.00

100	ь	21.60	24.60	23.10	এ .গগ
80	0	25.40	25.20	25.30	0.20
60	0	25.00	24.80	24.90	0.20
40	0	25.80	25.60	25.70	0.20
20	0	27.00	26.40	26.70	0.60
0	0	26.40	26.40	26.40	0.00
0	-20	26.60	26.40	26.50	0.20
20	-20	26.20	26.20	26.20	0.00
40	-20	24.40	25.60	25.00	1.20
60	-20	26.00	25.40	25.70	0.60
80	-20	27.20	27.00	27.10	0.20
100	-20	29.60	29.20	29.40	0.40
120	-20	30.20	29.40	29.80	0.80
140	-20	30.40	29.80	30.10	0.60
160	-20	34.80	33.60	34.20	1.20
180	-20	35.00	36.40	35.70	1.40
200	-20	36.40	37.20	36.80	0.80
220	-20	33.80	32.00	32.90	1.80
240	-20	33.80	33.80	33.80	0.00
260	-20 -20	34.00	33.00	33.50	1.00
280	-20 -20	34.60	33.80	34.20	0.80
300 320	-20 -20	35.20	34.80 35.40	35.00 35.60	0.40
340	-20 -20	35.80 35.60	35.40 35.40	35.50	0.40
360	-20 -20	33.00 35.00	35.40	33.50 35.50	0.20 0.20
380	-20 -20	35.00 35.00	33.40	33.30 35.00	0.20 0.00
400 200	-20	33.00	33.40 33.40	33.20	0.40
420	-20	32.60	32.80	32.70	0.20
110	-20	32.80	32.80	32.00	U.UU
460	-20	15.00	45.00	30.00	30.00
480	-20	33.20	33.00	33.10	0.20
500	-20	31.20	31.80	31.50	0.60
520	-20	30.40	30.20	30.30	0.20
540	-20	27.20	27.80	27.50	0.60
560	-20	25.00	25.00	25.00	0.00
560	-40	26.20	24.60	25.40	1.60
540	-40	52.80	76.60	64.70	23.80
520	-40	79.40	103.60	91.50	24.20
500	-40	105.60	149.00	127.30	43.40
480	-40	103.00	119.20	111.10	16.20
460	-40	127.60	142.20	134.90	14.60
440	-40	124.80	137.80	131.30	13.00
420	-40	88.80	101.00	94.90	12.20
400	-40	90.40	117.20	103.80	26.80
380	-40	86.40	101.80	94.10	15.40
360	-40	99.80	139.20	119.50	39.40
340	-40	93.40	112.20	102.80	18.80
320	-40	93.60	113.40	103.50	19.80
300	-40	89.60	106.20	97.90	16.60
280	-40	90.60	102.60	96.60	12.00
260	-40	96.40	105.20	100.80	8.80
240	-40	97.60	105.80	101.70	8.20
220	-40	87.40	101.40	94.40	14.00
200	-40	94.00	135.40	115.10	40.60
180	-40	62.60	101.40	92.00	18.80
160	-40	୦୦.୦ଖ	102.20	34.20	15.40

140	-40	67.40	78.80	73.10	11.40
120	-40	80.80	90.80	85.80	10.00
100	-40	80.40	101.00	90.70	20.60
80	-40	67.60	81,60	74.60	14.00
60	-40	48.40	58.40	53.40	10.00
40	-40	28.40	29.00	28.70	0.60
20	-40	26.40	26.20	26.30	0.20
0	-40	26.80	26.40	26.60	0.40

FAST	NORTU	1.0000	unnes	
EAST COORDINATE	NORTH COORDINATE	LOWER INTENSITY	UPPER INTENSITY	GRADIENT
COOKDINATE	COOKDINATE	INTENSITI	TRICASTIT	CKHDIENI
	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • •	• • • • • • • • • •
0.0	0.0	58854.9	58833.0	21.8
-5.0	0.0	58755.4	58757.8	-2.4
-10.0	0.0	58778.1	58773.6	4.5
-15.0	0.0	58797.8	58790.8	7.1
-20.0	0.0	58799.5	58792.5	7.0
-25.0	0.0	58803.0	58793.1	9.9
-30.0	0.0	58798.3	58793.0	5.3
-35.0	0.0	58813.8	58806.0	7.9
-10.0	0.0	58816.6	58801.0	15.6
-45.0	0.0	58831.2	58826.5	4.7
-45.0	5.0	58721.0	58741.0	-19.9
-40.0	5.0	58779.2	58771.4	7.9
-35.0	5.0	58783.0	58772.6	10.4
-30.0	5.0	58776.8	58767.3	9.5
-25.0	5.0	58763.5	58759.4	4.1
-20.0	5.0	58776.3	58771.0	5.2
-15.0	5.0	58769.5	58764.7	4.8
-10.0	5.0	58762.3	58757.9	4.4
~5.0	5.0	58759.8	58756.4	3.4
0.0	5.0	58831.4	58812.4	19.0
0.0	10.0	58860.7	58827.7	33.1
~5.0	10.0	58773.7	58769.7	4.0
-10.0	10.0	58797.1	58783.2	14.0
-15.0	10.0	58796.1	58786.3	9.8
-20.0	10.0	58766.0	58764.9	1.1
-25.0	10.0	58753.4	58753.9	-0.4
-30.0	10.0	58778.9	58771.9	7.0
-35.0	10.0	58793.1	58784.1	9.1
-40.0	10.0	58770.0	58768.1	1.9
-45.0	10.0	58721.5	58733.3	-11.8
-50.0	15.0	58815.2	58801.6	13.6
-45.0	15.0	58756.6	58752.7	3.9
-40.0	15.0	58752.5	58751.4	1.1
-35.0	15.0	58769.3	58762.0	7.3
-30.0	15.0	58763.7	58753.9	9.8
-25.0	15.0	58742.4	58739.2	3.2
-20.0	15.0	58759.9	58755.3	4.6
-15.0	15.0	58781.4	58773.1	8.3
-10.0	15.0	58773.5	58764.6	8.8
-5.0	15.0	58734.5	58741.2	-6.8
0.0	15.0	58825.3	58805.1	20.3
0.0	20.0	58825.8	58802.3	23.5
-5.0	20.0	58732.3	58734.4	-2.1
-10.0	20.0	58763.2	58751.9	11.3
-15.0	20.0	58780.9	58763.0	17.8
-20.0	20.0	58740.0	58739.6	0.4
-25.0	20.0	58722.3	58723.0	-0.7
-30.0	20.0	58740.6	58737.7	2.9
-35.0	20.0	58746.2	58744.4	1.8
-40.0	20.0	58756.0	58754.1	1.8

EAST	NORTH COORDINATE	LOWER INTENSITY	UPPER INTENSITY	GRADIENT
	COORDINATE	INTERSTIT		
	• • • • • • • • • • • • • • • • • • • •	••••		
-45.0	20.0	58761.4	58762.1	-0.7
-50.0	20.0	58826.3	58817.3	9.0
-50.0	25.0	58815.8	58812.4	3.4
-45.0	25.0	58772.4	58763.7	8.7
-40.0	25.0	58764.5	58754.9	9.6
-35.0	25.0	58743.0	58737.5	5.4
-30.0	25.0	58730.2	58723.2	7.0
-25.0	25.0	58716.9	58716.1	0.8
-20.0	25.0	58754.5	58744.1	10.3
-15.0	25.0	58757.7	58747.9	9.8
-10.0	25.0	58750.6	58741.2	9.4
~5.0 0.0	25.0 25.0	58706.5 58794.4	58715.8 58779.1	-9.4 15.3
0.0	30.0	58782.5	58765.1	17.4
-5.0	30.0	58702.4	58704.7	-2.3
-10.0	30.0	58724.6	58716.7	7.9
-15.0	30.0	58731.7	58720.2	11.5
-20.0	30.0	58719.7	58713.7	6.1
-25.0	30.0	58699.3	58698.1	1.3
-30.0	30.0	58692.9	58694.5	-1.6
-35.0	30.0	58711.3	58709.6	1.8
-40.0	30.0	58743.3	58734.3	9.1
-45.0	30.0	58762.5	58761.9	0.7
-50.0	30.0	58832.4	58825.8	6.6
-50.0	35.0	58831.0	58828.1	2.9
-45.0	35.0	58789.8	58771.4	18.3
-40.0	35.0	58738.5	58727.8	10.7
-35.0	35.0	58708.9	58702.2	6.6
-30.0	35.0	58705.3	58695.2	10.1
-25.0	35.0	58695.3	58689.3	6.0
-20.0	35.0	58693.2	58686.4	6.9
-15.0	35.0	58716.5	58707.9	8.6
-10.0 -5.0	35.0 35.0	58722.2	58712.2 58705.0	10.1 0.9
0.0	35.0	58705.9 58783.6	58762.6	21.1
0.0	40.0	58773.4	58751.5	21.9
-5.0	40.0	58677.4	58676.4	1.0
-10.0	40.0	58693.9	58683.0	10.8
-15.0	40.0	58695.0	58681.7	13.3
-20.0	40.0	58650.9	58654.7	-3.7
-25.0	40.0	58651.3	58655.3	-4.0
-30.0	40.0	58676.2	58675.5	0.7
-35.0	40.0	58703.7	58697.0	6.7
-40.0	40.0	58715.5	58711.1	4.5
-45.0	40.0	58752.4	58745.6	6.8
-50.0	40.0	58781.8	58783.6	-1.8
-55.0	40.0	58891.6	58883.5	8.1
-55.0	45.0	58796.3	58807.6	-11.3
-50.0	45.0	58718.4	58724.7	-6.3
-45.0	45.0	58684.1	58688.2	-4.1

5 A G #	NODTU	LOUER	UPPER	
EAST	NORTH COORDINATE	INTENSITY	INTENSITY	GRADIENT
COOKDINHIE	COORDINATE			
••••	••••			
-40.0	45.0	58658.3	58665.8	-7.5
-35.0	45.0	58690.7	58685.0	5.7
-30.0	45.0	58686.1	58678.4	7.7
-25.0	45.0	58655.5	58655.9	-0.4
-20.0	45.0	58652.3	58649.9	2.4
-15.0	45.0	58660.7	58659.4	1.3 -1.2
-10.0	45.0	58654.0	58655.2 58646.6	1.4
-5.0	45.0	58647.9 58745.3	58727.6	17.7
0.0	45.0 50.0	58757.0	58732.0	25.0
0.0 -5.0	50.0	58645.0	58648.9	-3.9
-10.0	50.0	58673.2	58665.6	7.6
-15.0	50.0	58691.0	58677.4	13.6
-20.0	50.0	58666.1	58664.0	2.2
-25.0	50.0	58684.9	58676.3	8.6
-30.0	50.0	58707.7	58692.2	15.6
-35.0	50.0	58688.5	58678.2	10.3
-40.0	50.0	58654.1	58657.1	-3.0
-45.0	50.0	58684.7	58681.2	3.5
-50.0	50.0	58724.4	58718.9	5.5
-55.0		58777.0	58781.8	-4.8
-60.0		58873.2	58842.6	30.6
-55.0	_	58733.2	58736.6	-3.4 12.4
-50.0	_	58711.6	58699.2 58663.3	11.8
-45.0		58675.1 55628.5	58628.9	-0.4
-40.0		58662.0	58651.3	10.7
-35.0 -30.0		58678.4	58666.5	11.9
-25.0	_	58686.9	58673.2	13.7
-20.0		58693.7	58681.3	12.4
-15.0		58708.0		11.4
-10.0	_	58702.5	58687.9	14.6
-5.0		58656.0	58652.1	3.9
0.0	55.0	58721.2		13.7
0.0		58724.0	58702.6	21.4
-5.0		58649.8		1.4
-10.0	_	58722.7		16.1 57.7
-15.0		58832.8		11.8
-20.0		58692.0	5868 0. 2 58658.9	5.2
-25.0		58664.1 58651.9		5.1
-30.0 -35.0	_	58646.3		4.9
-40.0		58614.5	_	-5.7
-45.0		58640.3		1.0
-50.0		58669.3		6.5
-55.0		58647.6		-16.2
-60.0		58776.4		8.4
-60.6		58675.6		-6.5
-55.0		58575.3	58599.1	-23.7
-50.6		58642.6	58639.4	3.2

EAST	NORTH	LOWER	UPPER	
COORDINATE	COORDINATE	INTENSITY	INTENSITY	GRADIENT
• • • • • • • • •	• • • • • • • • •	• • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • •
-45.0	65.0	58643.2	58640.5	2.6
-40.0	65.0	58649.2	58645.0	4.2
-35.0	65.0	58641.1	58640.1	1.0
-30.0	65.0	58641.4	58641.5	-0.1
-25.0	65.0	58651.2	58647.6	3.6
-20.0	65.0	58662.3	58655.2	7.1
-15.0	65.0	58559.3	58607.4	-48.2
-10.0	65.0	58683.0	58667.4	15.6
-5.0	65.0	58679.1	58673.4	5.8
0.0	65.0	58701.3	58693.2	8.2
0.0	70.0	58767.0	58738.5	28.5
-5.0	70.0	58706.0	58694.6	11.5
-10.0	70.0	58696.3	58688.4	7.8
-15.0	70.0	58678.7	58674.9	3.8
-20.0	70.0	58673.1	58668.8	4.3
-25.0	70.0	58688.4	58679.4	9.0
-30.0	70.0	58669.3	58667.1	2.2
-35.0	70.0	58683.6	58677.1	6.5
-40.0	70.0	58690.9	58681.1	9.7
-45.0	70.0	58688.0	58678.0	10.0
-50.0	70.0	58658.1	58652.0	6.1
-55.0	70.0	58635.3	58642.0	-6.7
-60.0	70.0	58690.1	58690.0	0.1
-60.0	75.0	58764.3	58743.1	21.1
-55.0	75.0	58702.9	58698.6	4.2
-50.0	75.0	58675.8	58679.9	-4.1
-45.0	75.0	58706.4	58696.2	10.2
-40.0	75.0	58735.2	58717.7	17.5
-35.0	75.0	58728.2	58714.1	14.2
-30.0	75.0	58746.1	58725.8	20.3
-25.0	75.0	58726.3	58710.8	15.5
-20.0	75.0	58645.0	58661.8	-16.8
-15.0	75.0	58718.5	58702.3	16.2
-10.0	75.0	58739.8	58712.9	27.0
-5.0	75.0	58697.4	58680.9	16.5
0.0	75.0	58702.0	58687.6	14.4
0.0	80.0	58589.7	58608.0	-18.4
-5.0	80.0	58635.9	58642.0	-6.1
-10.0	80.0	58718.0	58700.1	17.9
-15.0	80.0	58731.3	58717.9	13.4
-20.0	80.0	58721.7	58708.1	13.6
-25.0	80.0	58718.1	58711.8	6.3
-30.0	80.0	58754.4	58737.1	17.3
-35.0	80.0	58760.6	58743.2	17.3
-40.0	80.0	58774.9	58753.1	21.8
-45.0	80.0	58745.4	58737.0	8.4
-50.0	80.0	58742.4	58730.2	12.1
-55.0	80.0	58756.5	58749.5	7.0
-60.0	80.0	58812.5	58794.6	17.9
-65.0	85.0	58853.6	58831.0	22.6

EAST	NORTH	LOWER	UPPER	
COORDINATE	COORDINATE	INTENSITY	INTENSITY	GRADIENT
• • • • • • • • •	• • • • • • • • •	• • • • • • • • • • •	• • • • • • • • • • •	• • • • • • • • •
60.0	85.0	50000 O	E0707 6	12.3
-60.0		58800.9 58764.6	58787.6 58753.7	13.3
-55.0	85.0			10.9
-50.0	85.0	58754.2	58740.4	13.9
-45.0	85.0	58738.6	58735.0	3.6
-40.0	85.0	58757.5	58747.3	10.2
-35.0	85.0	58767.3	58749.9	17.5
-30.0	85.0	58726.1	58729.5	-3.4
-25.0	85.0	58715.0	58711.1	4.0
-20.0	85.0	58705.7	58699.6	6.1
-15.0	85.0	58726.2	58708.5	17.7
-10.0	85.0	58707.0	58701.6	5.4
-5.0	85.0	58702.9	58695.0	8.0
0.0	85.0	58736.8	58713.7 58754.9	23.1
0.0 -5.0	90.0 90.0	58783.2	58725.0	28.3
-10.0	90.0	58746.2 58723.6	58707.8	21.2 15.8
-15.0	90.0	58679.9	58683.8	-3.8
-20.0	90.0	58738.9	58716.6	22.3
-25.0	90.0	58723.6	58713.7	9.8
-30.0	90.0	58758.2	58735.8	22.4
-35.0	90.0	58775.2	58755.4	19.8
-40.0	90.0	58769.5	58753.7	15.8
-45.0	90.0	58762.1	58747.1	15.0
-50.0	90.0	58767.6	58747.4	20.2
-55.0	90.0	58762.8	58753.6	9.1
-60.0	90.0	58818.1	58806.2	11.9
~65.0	90.0	58869.7	58849.4	20.3
-65.0	95.0	58897.0	58852.8	44.2
-60.0	95.0	58815.0	58791.8	23.2
-55.0	95.0	58772.6	58753.1	19.5
-50.0	95.0	58753.9	58743.0	10.9
-45.0	95.0	58796.9	58762.8	34.2
-40.0	95.0	58549.6	58648.3	-98.8
-35.0	95.0	58742.4	58729.0	13.4
-30.0	95.0	58741.6	58724.0	17.6
-25.0	95.0	58728.9	58721.3	7.6
-20.0	95.0	58668.4	58670.0	-1.6
-15.0	95.0	58675.9	58674.4	1.5
-10.0	95.0	58722.1	58703.6	18.4
-5.0	95.0	58715.6	58712.4	3.1
0.0	95.0	58798.7	58768.9	29.8
0.0	100.0	58766.3	58738.7	27.7
-5.0	100.0	58698.6	58693.6	5.1
-10.0	100.0	58731.4	58709.2	22.2
-15.0	100.0	58779.5	58681.2	98.2
-20.0	100.0	58616.5	58638.6	-22.1
-25.0	100.0	58645.5	58671.1	-25.6
-30.0	100.0	58650.6	58678.1	-27.5
-35.0	100.0	58729.4	58707.1	22.3
-40.0	100.0	58753.6	58729.8	23.8

			110000	
EAST	NORTH	LOWER	UPPER	CPADICHT
COORDINATE	COORDINATE	INTENSITY	INTENSITY	GRADIENT
• • • • • • • • •	• • • • • • • • •	• • • • • • • • • • •	• • • • • • • • • • •	• • • • • • • • •
-45.0	100.0	58705.8	58709.0	-3.2
-50.0	100.0	58715.7	58714.3	1.4
-55.0	100.0	58762.3	58744.9	17.4
-60.0	100.0	58729.0	58733.3	-1.3
-65.0	100.0	58805.6	58790.1	15.5
-70.0	100.0	58826.0	58802.8	23.1
-70.0	105.0	58791.2	58767.8	23.4
-65.0	105.0	58765.3	58747.3	18.0
-60.0	105.0	58715.1	58712.7	2.4
-55.0	105.0	58752.6	58734.0	18.6
-50.0	105.0	58723.1	58713.6	9.4
-45.0	105.0	58724.3	58714.3	10.0
-40.0	105.0	58717.4	58705.8	11.6
-35.0	105.0	58649.7	58658.5	-8.8
-30.0	105.0	59027.5	58867.5	160.0
-25.0	105.0	58745.4	58737.2	8.2
-20.0	105.0	58465.4	58580.6	-115.2
-15.0	105.0	58609.9	58619.2	-9.3
-10.0	105.0	58685.8	58675.5	10.3
-5.0	105.0	58685.2	58675.5	9.6
0.0	105.0	58715.4	58699.3	16.1
0.0	110.0	58691.4	58673.1	18.3
-5.0	110.0	58708.4	58682.0	26.3
-10.0	110.0	58675.1	58665.4	9.7
-15.0	110.0	58642.6	58640.3	2.3
-20.0	110.0	58693.9	58665.7	28.3
-25.0	110.0	58821.2	58746.0	75.2
-30.0	110.0	58756.0	58745.4	10.6
-35.0	110.0	58746.2	58717.9	28.3
-10.0	110.0	58696.1	58691.8	4.2
-45.0	110.0	58735.4	58733.0	2.4
-50.0	110.0	58715.5	58714.9	0.7
-55.0	110.0	58712.2	58709.7	2.5
-60.0	110.0	58726.5	58723.8	2.7
-65.0 -70.0	110.0	58727.4	58730.4 58734.8	-3.0 17.8
-70.0 -75.0	110.0 115.0	58752.5 58612.7	58734.8 58623.7	-11.1
-70.0	115.0	58532.1	58566.0	-33.9
-65.0	115.0	58541.2	58572.4	-31.3
-60.0	115.0	58594.6	58607.1	-12.5
-55.0	115.0	58616.3	58621.8	-5.5
-50.0	115.0	58652.6	58645.4	7.2
-45.0	115.0	58670.3	58657.7	12.6
-40.0	115.0	58687.6	58677.7	9.9
-35.0	115.0	58671.7	58667.3	4.3
-30.0	115.0	58656.2	58656.3	0.0
-25.0	115.0	58654.0	58647.6	6.4
-20.0	115.0	58549.1	58590.5	-41.4
-15.0	115.0	58670.4	58653.6	16.8
-10.0	115.0	58615.6	58609.6	6.0

EAST	NORTH	LOWER	UPPER	
COORDINATE	COORDINATE	INTENSITY	INTENSITY	GRADIENT
	• • • • • • • • •		• • • • • • • • • • •	• • • • • • • • •
-5.0	115.0	58563.1	58572.7	-9.6
0.0	115.0	58557.9	58562.3	-4.5
0.0	120.0	58098.7	58225.7	-127.0
-5.0	120.0	58294.6	58364.0	-69.4
-10.0	120.0	58380.6	58437.0	-56.5
-15.0	120.0	58451.0	58488.1	-37.1
-20.0	120.0	58514.1	58534.4	-20.3
-25.0	120.0	58637.1	58603.9	33.3
-30.0	120.0	58476.5	58513.4	-36.9
-35.0	120.0	58465.8	58502.9	-37.1
-40.0	120.0	58474.5	58502.1	-27.6
-45.0	120.0	58486.1	58512.5	-26.4
-50.0	120.0	58465.8	58508.3	-42.6
-55.0	120.0	58417.0	58470.9	-53.9
-60.0	120.0	58457.5	58490.0	-32.5
-65.0	120.0	58398.0	58452.4	-54.4
-70.0	120.0	583 70. 8	58420.2	-49.4

APPENDIX M

DAMES & MOORE TECHNICAL OPERATIONS PLAN (TOP)
AND HEALTH AND SAFETY PLAN

INSTALLATION RESTORATION PROGRAM PHASE II - CONFIRMATION/QUANTIFICATION STAGE 2

TECHNICAL OPERATIONS PLAN

FOR

DULUTH INTERNATIONAL AIRPORT, MINNESOTA

TACTICAL AIR COMMAND AND AIR NATIONAL GUARD

PREPARED FOR

UNITED STATES AIR FORCE OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY (OEHL) BROOKS AIR FORCE BASE, TEXAS 78235-5501

NOVEMBER 21, 1986

INSTALLATION RESTORATION PROGRAM PHASE II - CONFIRMATION/QUANTIFICATION STAGE 2

TECHNICAL OPERATIONS PLAN

FOR

DULUTH INTERNATIONAL AIRPORT, MINNESOTA

TACTICAL AIR COMMAND AND AIR NATIONAL GUARD

NOVEMBER 21, 1986

PREPARED BY

DAMES & MOORE 1550 NORTHWEST HIGHWAY PARK RIDGE, ILLINOIS 60068

CONTRACT NO. F33615-83-D-4002, Order 0038

OEHL TECHNICAL MONITOR: 2nd Lt. Gary Woodrun

PREPARED FOR

UNITED STATES AIR FORCE OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY (OEHL) BROOKS AIR FORCE BASE, TEXAS 78235-5501

D&M Job No. 01016-267-07

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TECHNICAL OPERATIONS PLAN INSTALLATION RESTORATION PROGRAM, PHASE II, STAGE 2 DULUTH INTERNATIONAL AIRPORT, MINNESOTA

1.0 INTRODUCTION

This Technical Operations Plan (TOP) describes the methods and procedures that will be used to accomplish the objectives of the Phase II, Stage 2 field investigation of the United States Air Force (USAF) Installation Restoration Program (IRP) for Duluth International Airport (IAP), Minnesota. The IRP is a nationwide effort intended to identify, evaluate the extent of, and mitigate environmental contamination potentially induced by the mobilization and migration of hazardous or toxic chemicals from past disposal or other handling practices at USAF facilities. On the basis of the findings of the Phase I Records Search (Engineering-Science, 1982) and the Phase II, Stage 1 Problem Confirmation Study (Roy F. Weston, Inc., 1984), the USAF Occupational and Environmental Health Laboratory (OEHL) retained Dames & Moore under Contract No. F33615-83-D-4002, Order No. 0038, to conduct the Phase II, Stage 2 study at Duluth IAP.

The Phase I and Phase II, Stage 1 contractors' reports were carefully reviewed, and their recommendations for the Phase II, Stage 2 program were considered. A site visit/briefing at Duluth IAP was undertaken on May 15, 1985, to discuss and inspect the sites to be investigated during the Phase II, Stage 2 study. A presurvey was conducted to determine the approach to be used in accomplishing the requirements of Phase II, Stage 2 of the IRP. Additionally, written comments provided by U.S. Environmental Protection Agency Region V (USEPA, 1985) and the Minnesota Pollution Control Agency (MPCA, 1985) generated by review of the above cited reports were discussed. Attendees at the meeting included:

Col. Jerry P. Dougherty
Lt. Col. Edward Barnes
Lt. Col. Curtis P. Jones
Maj. Joel D. Manns
MSgt. Merlin O. Carlson
Mr. Larry Livesay
Mr. Tim Musick
Dr. Kenneth J. Stimpfl

HQ TAC/SGPB, Langley AFB, VA
USAF OEHL/TS, Brooks AFB, TX
148 CSS/CC MN ANG, Duluth IAP, MN
Base Civil Engineering ANG Duluth IAP, MN
148 TAC Clinic/SGPB, Duluth IAP, MN
MPCA, Roseville, MN
MPCA, Duluth, MN
Dames & Moore, Park Ridge, IL

1.1 PURPOSE AND SCOPE

The purpose of the TOP is to detail the methods and procedures that will be used to accomplish the tasks defined during the Stage 2 Investigation at Duluth IAP.

Guidelines of the MPCA, Occupational Safety and Health Administration (OSHA), USEPA, and USAF, as well as previous investigations at Duluth IAP, were reviewed to select the methods that would be most appropriate for this investigation. The TOP is designed primarily to give guidance to personnel in the field and to ensure that standard methods of investigation are used. However, not all field problems can be anticipated, and the field personnel must exercise professional judgment when applying the guidelines.

The purpose of the Phase II, Stage 2 investigation at Duluth IAP, as described in this TOP, is to conduct a field investigation, with subsequent laboratory analysis of collected samples, data interpretation, and reporting, to accomplish the following objectives:

- o Confirm the presence or absence of contamination within the specified areas of investigation;
- o Determine the magnitude of contamination and the potential for and rate of migration of those contaminants in various environmental media;
- o Identify potential environmental and health risk consequences of migrating pollutants based on state or federal standards for those contaminants; and
- o Delineate additional investigations required beyond this stage to reach the Phase II objectives.

The Phase II, Stage 2 effort at Duluth IAP will entail a follow-up investigation of sites evaluated during Phase II, Stage 1, and an initial monitoring program at six additional sites. The sites included in this study are identified in Table 1-1 and can be located in Figure 1-1. The sites to receive follow-up investigative work are Goose Dump 1, the Fire Training Areas, DPDO Storage Area "C", and the Tank Farm Area. The two fire training areas (FT-1 and FT-2) have been consolidated into one site.

The recommended program requires the installation of 30 additional ground water monitor wells and 19 soil borings. Sampling for chemical constituent analysis will be conducted at the 30 new monitor wells and 10 existing monitor wells for the parameters listed in Table 1-2. In addition, geophysical surveys will be performed using a metal detector and a magnetometer at Site 4 to locate underground pipes; at Site 6 to locate the dump site drums; and at Sites 7, 9, and 10 to accurately define the site boundaries. At Site 4, an electromagnetic survey will also be performed to identify leak sites from the underground pipes. A detailed study of the aerial photographs will be performed at Sites 6, 7, 9, and 10 to accurately locate the contaminated areas.

TABLE 1-1
LISTING OF SITES

Site Number	Phase I Number	Site Description
1	D-1 (TAC)	Goose Dump 1
2	FT-1 and FT-2 (ANG)	Fire Training Areas
3	S-2 (ANG)	DPDO Storage Area "C"
4	SP-1 (ANG)	Tank Farm Area
5	D-4 (TAC)	South Goose Dump
6	D-2 (TAC)	Goose Dump 2
7	D-6 (TAC)	Runway 13 NE Disposal
8	S-1 (ANG)	Old DPDO Storage Area
9	D-9 (TAC)	Disposal Pit
10	RD-1 (ANG)	Low-Level Radioactive Waste Disposal

Note: ANG = Air National Guard sites, TAC = Tactical Air Command sites.

[3]

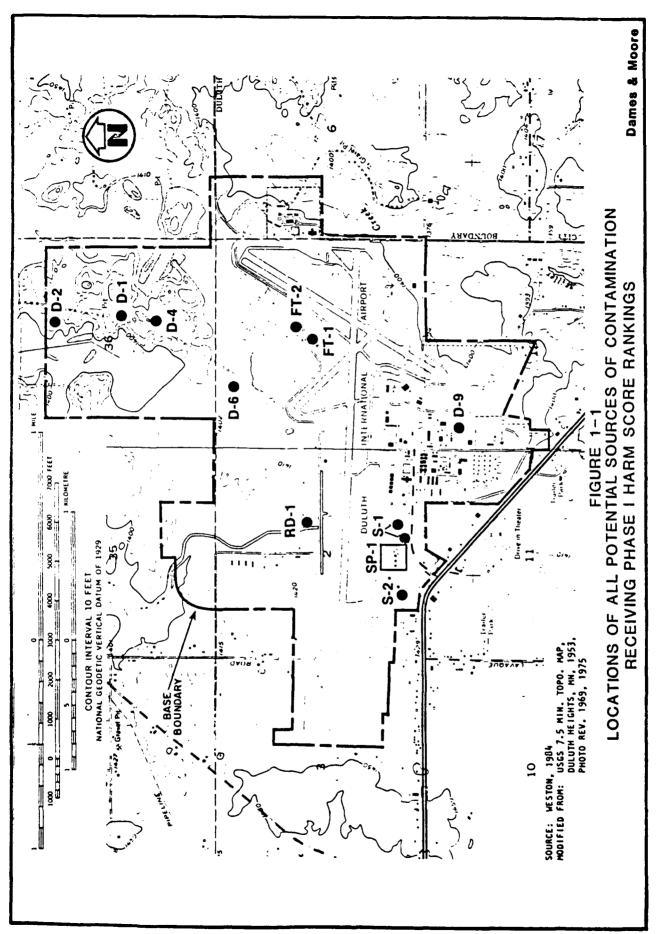


TABLE 1-2 ANALYTICAL PROGRAM

			SITE 2			WATERS						N.HBER		
PARAME TER	METHOD/ EXTRACTION METHOD	S1 TE 1 D-1	ff-1, Ff-2	SIFE 3 SP-2	SITE 4 SP-1	SITE 5	51 TE 6 D-2	St TE 7 0-6	51 TE 8	511E 9 0-9	SI TE 10 PD-1	24MPLES	ЭС р	TO" AL
Purgeable Halocarbons	E 601	6	14	7	12	6	-	4	5	•	-	54	9	93c
Purgeable Aromatics	E 602	6	14	7	12	6	-	4	5	-	•	54	9	930
Oil and Grease (IR)	E 413.2	6	14	7	12	6	-	4	5	-	-	54	9	63
Arsenic	E 206.2	6	-	7	-	6	-	4	5	-	-	28	5	33
Berium	E 208.2	6	-	7	-	6	-	4	5	-	-	28	5	33
Cadmium	€ 213.2	6	-	7	-	6	-	4	5	-	-	28	5	33
Chromium	E 218.1	6	-	7	-	6	-	4	5	-	-	28	5	33
Lead	E 239.2	6	-	7	-	6	-	4	5	-	-	28	5	33
Mercury	E 245.1	6	-	7	-	6	•	4	5	-	-	28	5	33
Selenium	E 270.3	6	-	7	-	6	-	4	5	-	-	28	5	33
Silver	E 272.2	6	-	7	-	6	-	4	5	-	-	28	5	33
Pesticides/ PCBs	E 608	6	-	7	-	6	-	4	5	-	•	28	5	490
Herbicides	£ 615	6	-	7	-	6	-	4	5	-	-	28	5	490
Phenal	E 420.2	6	14	7	-	6	-	4	5	-	-	42	8	50
Acetone	ASTM D 3695-82	-	-	-	-	-	-	-	-	1	-	1	1	2
Picric Acid	USATHAMA 28	-	-	-	-	-	-		-	1	-	1	1	2
Gross Alpha	Standard Methods, 16th ed., 703	•	-	*	•	-	-	-	•	-	3	3	1	4
Gross Beta	Standard Methods, 16th ed., 703	-	-	-	-	-	-	-	-	-	3	3	1	4
Radius-226	E600/4-80-032, 903.0	-	-	-	-	-	-	-	-	-	3	3	1	4
Radium-228	E600/4-80-032, 904.0	-	-	-	-	-	-	-	-	-	3	3	1	4
PARAMETER	HETHOD/ EXTRACTION HETHOD	SI TE 1 D-1	SITE 2 FT-1, FT-2	SITE 3 SP-2	SITE 4 SP-1	SITE 5 0-4	51 TE 6 0-2	51 TE 7 2-6	STITE B	SITE 9 0-9	S1 TE 10 PD-1	OF SAMPLES	CCP	101 N SAMPL (
Purgeable Halocarbone	SW 8010 ^e	9	17	16	23	8	4	8	11	-	-	%	15	1640
Purgeable Aromatics	SW 8020®	9	17	16	23	8 .	4	8	11	-	-	96	15	1649
Oil and Grease (IR)	SW 3550 and 413.2	9	17	16	23	8	4	8	11	-	-	96	15	111
Arsenic	SW 3050 and 7060	9	-	16	-	8	-	8	11	-	-	52	9	67
Barrum	5W 3050 and 6010	9	-	16	-	8	-	6	11	-	•	52	9	61
Cadmium	SW 3050 and 6010	9	-	16	-	8	-	8	11	-	-	52	9	61
Chromium	SW 3050 and 6010	9	-	16	-	8	-	8	11	-	•	52	9	61
Leed	SW 3050 and 6010	9	-	16	-	8	-	8	11	-	-	52	9	61
Mercury	SW 7471	9	•	16	-	8	-	8	11	-	•	52	9	ઘ
Selenium	SN 3050 and 7740	9	-	16	-	8	-	8	11	-	-	52	9	61
Silver	SM 3050 and 6010	9	•	16	-	8	-	8	11	-	-	52	9	દા
Pesticides/ PC8s	SW 3550 and 8080	9	-	16	-	8	-	8	11	-	•	52	9	901
Herbicides	SW 8150	9	-	16	-	8	-	8	11	-	-	52	9	90
Phenol	E 420.2 modified	9	17	16	-	8	-	8	11	-	-	69	11	90
Acetone	Water extr. and ASTM D 3695-82	-	-	-	-	-	-	-	-	2	-	2	1	,
Picric Acid	USATHAMA 2C	•	-	-	•	-	-	-	-	2	-	2	1	3
	NIOSH P & CAM 338	-	-	-	-	-	4	•	-	•	-	•	1	5
Ethylene Glycol	modified for soil	-	•											
Glycol Sail Maisture Determination	modified for soil	,	17	16	23	8	4	8	١٤	2	-	98	15	113
Glycol Sail Maisture	modified for soil a 40 CFR 261.24	9	SAMP	LES AS NE	EDED AND	8 NOT SPECE		ETE (TOTA	L MUMBER	= 15)	-	90 15	15 2	113 17

The methods cited in the analysis protocols come from the following sources:

[&]quot;E" Methods (Water Only) E 100 through E 500: Methods for Chemical Analysis of Water and Mastes, EPA-609/4-79-020 (USEPA, 1983), E 600: Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (USEPA, 49 FR 209, 10/26/84).

[&]quot;Sd" Methods | Teet Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 2nd ed. (USEPA, 1984). (Water & Soli)

eincludes both well and surface water samples.

bOC field sample includes duplicates, trip blanks, and rinse (field) blanks.

Cfotel number of samples includes second column confirmation on 50% of samples (to include field QC samples).

 $[\]ensuremath{\text{d}}\xspace$ includes both borehole and sediment samples.

Matraction included in method.

^{*}Samples to be analyzed to be collected from soil cuttings.

1.2 INSTALLATION DESCRIPTION AND HISTORY

1.2.1 Location and Host Organizations

The Duluth IAP is located in St. Louis County, Minnesota, approximately 7 miles northwest of the city of Duluth, at the western end of Lake Superior. Opened in 1948 as the Williamson-Johnson Airport, this 1995-acre installation has been jointly operated by the USAF, the Minnesota Air National Guard (MANG), and the City of Duluth. Duluth IAP has hosted a variety of operational USAF activities during the period 1948 through 1981. Although USAF operational missions were terminated at Duluth IAP in December 1981, this Tactical Air Command (TAC) installation continues as a site of both commercial civilian and ANG activities. The host organization is the 148th Tactical Reconnaissance Group (MANG).

1.2.2 Hydrogeology

Duluth IAP is located on the Superior Upland, an extension of the Laurentian Upland of the Canadian Shield. The synclinal Lake Superior basin is a major structural feature of this region.

At Duluth IAP, the bedrock is composed of the Duluth Complex, consisting of Precambrian gabbro and several other igneous intrusive rock types. The Duluth gabbro extends beneath the Lake Super or basin in the form of a lopolith, a large lenticular centrally sunken intrusive mass. At Duluth, the lopolith is 12,000 feet thick (Thornbury, 1965). The Duluth Complex is located on the western limb of the Superior Syncline, the axis of which corresponds roughly to the axis of Lake Superior (Weston, 1984).

Surface deposits at Duluth IAP consist of Pleistocene age Late Wisconsinan glacial deposits. Topography in the vicinity of Duluth IAP reflects its recent glacial history as poorly defined deranged drainage dominates; numerous shallow lakes, swamps and bogs exist; and irregular low relief typifies the area.

The naturally occurring unconsolidated surface deposits at the base were glacial outwash. The Mille Lacs-Highland Moraine Association, a sandy, stony till, is present as ground moraine to the southeast of the base and end moraine to the northwest of the base (Hobbs and Goebel, 1982). Surface deposits have been modified at the base due to earthmoving activities. All four sites investigated during the Phase II, Stage I effort are located on structural fill or otherwise disturbed ground (Weston, 1984). Unconsolidated sediments are believed to range in thickness from 10 to 60 feet at Duluth IAP (Engineering-Science, 1982).

Surface elevations at Duluth IAP vary from approximately 1390 feet above mean sea level (msl) along the northern installation boundary to approximately 1430 feet msl near the developed south-central portion of the base.

Ground water at the base occurs both in the unconsolidated glacial sediments under water table (unconfined) conditions and in the underlying crystalline bedrock within fractures and voids.

The glacial drift aquifer, consisting of a heterogeneous mixture of sand, silt, clay, gravel, and cobbles, etc., is unstratified and locally very compact. This aquifer, which supplies adequate yields for farm and domestic consumption and is the most productive local aquifer, is in hydraulic communication with the underlying bedrock aquifer. Ground water in the glacial drift aquifer is generally encountered at depths of 3 to 25 feet below ground surface. Within the bedrock aquifer, wells drilled to depths of 100 to 700 feet generally encounter water at depths of 10 to 30 feet. Yields from the bedrock aquifer are usually poor (i.e., 5 gallons per minute or less). Water quality from both aquifers is generally good (Engineering-Science, 1982).

Within the Duluth IAP region, ground water, primarily from small capacity glacial drift wells, is utilized by individual domestic or agricultural consumers in isolated areas. City of Duluth water from Lake Superior is supplied to the Duluth IAP and adjacent communities.

Recharge to local aquifers consists of precipitation falling on the unsaturated portion of the aquifer or, in the case of the bedrock aquifer, percolation through a communicating unit in contact with the aquifer.

It has been postulated that Duluth IAP appears to lie within a ground water discharge zone, as evidenced by typically high soil unit water levels, perennial stream flow on and adjacent to the base, and the presence of numerous large, permanent wetlands in the area (Engineering-Science, 1982).

The hydraulic head in the bedrock and the overlying glacial drift near Duluth IAP are similar, whereas the permeability of the bedrock is generally much lower than the permeability in the glacial aquifer. Although the two aquifers are hydraulically connected, the vertical flow from the sediments to the bedrock is believed to be low (Engineering-Science, 1982). Because of these conditions, the principal flow path of ground water in the area has been interpreted to be direct recharge from the ground surface to the shallow water table in the glacial drift, then horizontal flow in the water table to discharge to local streams and ponds (Weston, 1984). The water table, where not perched, is continuous with marsh and bog areas.

Surface drainage at the base flows to two drainage systems. A ground water divide is suspected to exist paralleling the main runway (Engineering-Science, 1982). To the north of the runway, drainage from the northern and western portions of the base drains to Beaver Creek and eventually to Wild Rice Lake, located north of the base. This drainage system includes drainage ditches from the fuel storage area, DPDO Storage Area "C", and the fire training areas. North of the runway in the vicinity of the Goose dump sites, a largely marshy area drains into two unnamed drainageways that flow into Wild Rice Lake. Southeast of the runway, drainage flows south to Miller Creek, which feeds into the St. Louis River (Weston, 1984).

1.3 INDIVIDUAL SITES

1.3.1 Site 1: D-1 Goose Site Dump

Site D-1 is located in a pocket swamp north of the abandoned Goose Site bunkers and to the east of the access road. The period of operation for this site is unknown. The Phase I report notes that approximately 15 empty and rusty 20% DDT drums were observed scattered throughout an approximately 100- by 75-foot area. The barrels appeared empty, and they were not recently discarded.

A potential for migration of pollutants from this site to Wild Rice Lake exists, either by surface water drainage or by ground water flow.

1.3.2 Site 2: FT-1 Fire Training Area (1951 to Early 1960s) and FT-2 Fire Training Area (Early 1960s to Present)

During the site visit/briefing, it was decided that both fire training areas should be investigated as one site. Both fire training areas, located north of the main runway, are situated in the V shape formed by the two smaller runways.

Site FT-1, in use from 1951 to the early 1960s, is located south of the access road. The activities were conducted in two excavated pits, approximately 40 feet wide, 50 feet long, and 3 to 4 feet in depth, and contained about 2 feet of standing water. For fire training exercises, 300 to 1000 gallons of flammable materials were placed in the pits, ignited, and extinguished with a protein-based foam, aqueous film-forming foam (AFFF), or chlorobromomethane (CB). Carbon tetrachloride may have been used as an extinguishing agent during the early years of pit operation. Materials burned included JP-4 and drummed materials that were not accepted by DPDO for disposal.

Waste materials and residue remained in the pits following the fire training exercises. The fire training exercises were held as frequently as once per week, although once per month was more typical. The pits at Site FT-1 were abandoned, leveled, and filled in the early 1960s (Engineering-Science, 1982).

From the early 1960s to the present, Site FT-2, located north of the access road, has been in use. Fire training activity was originally conducted in an excavated area of the site; the original perimeter berm was removed and the area graded in the early 1970s. Fire training activities are now conducted in a bermed circular area approximately 100 feet in diameter. Runoff from this site is uncontained. Drainage off site to the north eventually reaches Wild Rice Lake.

During the time of the Phase I report, two training exercises per month were carried out. Before the exercise, the ground was saturated with water to minimize infiltration. Up to 500 gallons of JP-4 fuel are burned during a typical training exercise. Formerly, contaminated fuels and drummed POL (waste oils, paint thinners, and solvents) were also burned in the pit. The burn is extinguished with approximately 30 gallons of AFFF. In the past, a protein-based foam and CB were used. After the burn, residual materials remaining in the area infiltrate into the ground or contribute to surface runoff.

Analyses of ground water carried out during the Phase II, Stage I investigation indicate that concentrations of total organic carbon (TOC), total organic halogens (TOX), and oil and grease were found in all seven wells installed in the fire training area.

1.3.3 Site 3: S-2 DPDO Storage Area "C"

Waste POL, waste solvents, and chemicals were stored in Area "C" of the DPDO Storage Site S-2 from 1965 to 1980. The site, approximately 90 feet long by 75 feet wide, is unfenced, unlined, and borders a drainage ditch that eventually drains to Wild Rice Lake. This site, no longer used for storage, was the location of minor drum leaks in the past, although no major spills have been recorded. In 1980, several drums of waste oil contaminated soil were removed from this site and spread within Site FT-2.

The proximity of Area "C" to the drainage ditch creates a potential for contaminant migration to exist. No other areas within the present DPDO Storage Area were used for liquid storage.

By means of ten soil borings and two sediment grab samples, the Phase II, Stage I investigation found levels of oil and grease and volatile organic aromatics (VOAs) in the unsaturated soil collected to a depth of 2 feet at the storage area.

1.3.4 Site 4: SP-1 Tank Farm Area

The tank farm area, located in the northwest portion of the base and in operation during the 1980s, occupies approximately 5 acres of land bordering the east-west runway. The facility consists of three above-ground storage tanks, fuel loading docks, associated outbuildings, and two small buried tanks: one for fuel oil and one holding tank for waste oil. The tanks are enclosed within earth dikes capable of retaining 110 percent of the tank capacities. Both open and covered drainageways bound the tank farm and loading dock area. These drainageways carry surface runoff from the site to a culvert, which runs from the northwest corner of the site, under the runway, and emerges north of the runway to discharge into Beaver Creek.

During repair of a water line in 1980, oil was observed at a depth of 6 to 7 feet about 100 feet outside the diked area. This excavation revealed diesel fuel No. 2 in the soil and ground water approximately 150 feet from Tank No. 3. Tank No. 3 was taken out of service because a leak was believed to originate with this tank or its feeder lines. The Phase II, Stage 1 report notes that the drainage ditches to the north of the dikes and adjacent to the loading area contain oily seepage. Oily ground water seepage has been observed as discharge from a sump pump operating in a valve box near the loading area. Contaminated soil from the excavation was removed and disposed off site.

1.3.5 Site 5: D-4 South Goose Bunker Dump

The south Goose bunker dump is located south of the abandoned Goose site marker in a swampy area. Several empty drums of unknown materials were deposited along the southern margin of a small body of water. The time of dumping into this area, which is approximately 25 by 35 feet, is unknown. As drainage from this unclosed dump area is northward to Wild Rice Lake, the potential for contaminant migration exists.

Bottom soil samples and one surface water sample from an adjacent pond were found to contain DDD during the Phase II, Stage 1 investigation. A PCB compound, Arochlor-1260, was reported from the same soil and water samples.

1.3.6 Site 6: D-2 Goose Site Dump

According to the Phase I report, approximately ten empty and rusty 55-gallon drums of deicing agent were observed in October 1981 at this site, a wooded ravine area located north of the abandoned Goose missile site and to the west of the access road.

As no other waste materials were observed in this area, it is unlikely that the area contains waste materials covered by fill. There exists a potential for contaminant migration, as drainage from this swampy locality is northward to Wild Rice Lake.

1.3.7 Site 7: D-6 Runway 13 NE Disposal Area

The D-6 disposal site was in use during the 1950s through 1970s. Located northeast of Runway 13, this less than 1-acre site has been closed with local soil cover to an approximate fill depth of 3 to 4 feet. General rubbish, hardfill, aircraft parts, empty drums, and possibly drums containing unburnable and unrecoverable chemicals are believed to have been disposed here. Some debris is still located on the surface. Although no leachate has been detected at this site, there exists a potential for leachate generation due to the shallow water table and, hence, migration of contaminants to local swamps and eventually to Wild Rice Lake.

1.3.8 Site 8: S-1 Old DPDO Storage Area

The base salvage yard area and old DPDO storage area were located north of Washington Street near Building 147. The period of operation for this site was 1950 through 1964. Materials handled through the DPDO storage area included DDT drums, waste fuel oil/solvents, and PCB transformers (Engineering-Science, 1982). Because minor leakage of drums of waste materials was likely to have occurred at this site, a potential for contamination exists.

1.3.9 Site 9: D-9 Disposal Pit

A small pit, approximately 8 by 7 feet, was used during the mid-1960s for the disposal of small amounts of picric acid and acetone from the medics clinic. The identification of percuric acid in the Phase I report (Engineering-Science, 1982) appeared incorrect. Through inquiries made by MANG personnel of the biomedical technician formerly employed at the medics clinic, it was learned that the material disposed of was picric acid (Carlson, 1985). This pit, which also contains small amounts of garbage, was closed with local soil cover.

Although the quantities of wastes disposed at this site are believed to be small, the nature of the materials and the location of the site indicate there is a potential for contaminant migration. Surface drainage in this area is to Miller's Creek.

1.3.10 Site 10: RD-1 Low-Level Radioactive Waste Disposal

At Site RD-1, during the 1950s, low-level radioactive materials such as cathode ray tubes, scopes, and instrument dials were deposited in a 15-foot deep trench approximately 40 feet long. General refuse and garbage covered these low-level radioactive wastes. Local soil cover was used to fill in this area. To insure that no contaminants are migrating from this site, it would be prudent to investigate this disposal area.

A review of the literature and discussions with knowledgeable personnel indicate that the wastes believed to be buried in this disposal area (i.e., cathode ray tubes and oscilloscopes) from this period were large instruments (approximately 2 by 3 feet) housed in metal cabinets containing transformers and, in many cases, small fans. The three radionuclides used for radioluminous dials were tritium, promethium-147, and radium-226.

Radionuclide	Half-Life (years)	Radiations	Average Activity/Dial
Tritium	12.3	Beta	1 mCi
Promethium-147	2.62	Beta	41 μCi
Radium-226	1600	Alpha, Gamma	0.5 μCi

Sources: Moghissi et al., 1978; Public Health Service, 1970.

2.0 SITE INVESTIGATION SUMMARY

2.1 OVERALL FACILITY

The recommended program addresses five original sites evaluated under the Phase II, Stage 1 investigation, and an additional monitoring at six additional sites. The two fire training areas (FT-1 and FT-2) have been consolidated into one site. These sites, listed in Table 1-1, will be investigated under Phase II, Stage 2 by means of 30 new monitor wells, 10 existing monitor wells, 19 borings, 18 surface water samples, and 20 sediment samples. Geophysical surveys are proposed to locate Sites 7, 9, and 10 and to investigate buried pipelines at Site 4 and drums at Site 6. An electromagnetic survey will be conducted to identify leak sites at Site 4. A detailed examination of existing aerial photographs will be performed at Sites 6, 7, 9, and 10.

2.2 INVESTIGATION OF INDIVIDUAL SITES

2.2.1 Site 1: D-1 Goose Site Dump

To assess the potential for migration of pollutants from this site, four monitor wells will be installed, one soil boring will be drilled, and two sediment and two water samples will be taken from the standing water, if present.

The monitor wells — one assumed upgradient and three assumed downgradient — will be located in the field as determined by site conditions. The wells will be drilled to a depth no greater than 30 feet, and the screened interval will extend from 5 feet above to 10 feet below the water table. A maximum of four soil samples will be collected and analyzed. The actual sample locations (borehole and depth) will be at the field supervisor's discretion. From each well, one water sample will be collected and analyzed.

One soil boring will be drilled to a depth of 10 feet or to the water table, whichever is shallower, in the vicinity of the highest concentration of barrels. Soil samples from the ground surface and at the 2½- and 5-foot depths will be analyzed.

Two sampling points will be designated from surface waters located at the site, or from surface waters adjacent to and downstream of the site. Both a water and a sediment sample from each of these surface water sample points will be collected. All water and soil samples will be analyzed for volatile organics and aromatic compounds, oil and grease, pesticides and herbicides, polychlorinated biphenyls (PCBs), phenols, and metals. In addition, soil moisture determination will be performed on the soil samples.

2.2.2 Site 2: FT-1 Fire Training Area (1951 to Early 1960s) and FT-2 Fire Training Area (Early 1960s to Present)

To more thoroughly define the potential level of contaminants at the fire training areas and to investigate possible migration of contaminants from the area, five monitor wells will be installed in the vicinity of the fire training areas. One well, in the assumed upgradient direction south of Site FT-1, will be used to provide information for the ambient water quality of the area. This well will be located in the field, and the intent is to position the well on the north side of the ground water divide as noted in the Phase II, Stage 1 report (Weston, 1984). Two wells will be placed downgradient of Site FT-1 on either side of the access road to investigate possible contaminants from Site FT-1. The final two wells will be positioned to the north and downgradient of Site FT-2. The wells will be drilled to a total depth of no greater than 30 feet, with a screened interval extending from 5 feet above to 10 feet below the water table. During the borehole drilling, a maximum of five soil samples will be collected and analyzed. The actual sample locations (borehole and depth) will be at the field supervisor's discretion. From each well, one water sample will be collected and analyzed.

Two soil borings, one in each fire training area, will be drilled to a total depth of 10 feet. If aerial photographs of Site FT-1 taken during the 1950s can be located to permit identification of the two separate pits, then an additional soil boring will be drilled in Site FT-1; each boring in the fire training burn pits will be centrally located. The soil sampling scheme will follow that outlined for the soil boring at Site 1.

In addition to the monitor wells and soil borings, sediment and surface water samples will be taken to investigate the character of surface runoff from the fire training areas. Dames & Moore concurs with the recommendation made in the Phase II, Stage 1 report regarding sampling the drainageway between the western extension of the access road and the southwestern boundary of Site FT-2. Two sediment and two surface water samples will be obtained from the drainageway, and one sediment and one surface water sample will be obtained from the swamp to the north and downgradient of Site FT-2.

In order to confirm the results of the previous analyses, one ground water sample will be taken from each of the six existing monitor wells. Water level readings will also be read at these wells.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, oil and grease, and phenol. In addition, soil moisture determination will be performed on the soil samples.

Monitor wells that exhibit a layer of floating fuel will be measured for the thickness of the fuel.

2.2.3 Site 3: S-2 DPDO Storage Area "C"

To further define the vertical and horizontal extent of surface and subsurface contamination at this site, three soil borings will be drilled, four monitor wells will be installed, and three sediment samples and three water samples will be collected from the drainageway north of the area.

The monitor wells will be positioned in the field such that one is upgradient and three are downgradient. The exact locations of these wells will be determined by site conditions. The wells will be drilled to a total depth of 30 feet, and the sampling scheme will follow the program for Site 1.

Three soil borings, positioned approximately along a line running north-south in the center of the storage area, will be drilled to a total depth of 10 feet. The soil sampling scheme will follow that outlined for the soil boring at Site 1.

To trace the possible migration of contaminants along the drainageway north of the storage area, three sediment and three surface water samples will be collected in the drainageway. The first sediment and water sample will be taken in the approximate position of Sample 2 (Phase II, Stage 1 study) to confirm the results already obtained. The next two sets of samples will be taken at 100-foot intervals along the drainageway. It is believed that sampling locations thus positioned will investigate off-site migration by surface flow.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, oil and grease, pesticides and herbicides, PCBs, phenols, and metals. In addition, soil moisture determination will be performed on the soil samples.

2.2.4 Site 4: SP-1 Tank Farm Area

Before field investigations commence, a geophysical survey will be conducted using a metal locator and/or magnetometer to locate underground pipes. A grid system will be constructed and tied into local ground coordinates so that pipeline locations can be verified for information provided by MANG personnel. An electromagnetic mapping (EM) survey will also be performed to identify leak sites from these pipes. The entire tank farm will be surveyed to include a minimum 50-foot buffer around the site perimeter. In addition, the survey will be expanded on the southern side of the tank farm area to the main access road.

The Phase II, Stage 1 study, by means of four monitor wells, two test pits, and 20 well points, revealed that free-floating fuel oil was observed in the soil borings, test pits, and drainage water in the immediate vicinity of the fuel storage area. Water levels obtained from the well points and monitor wells permitted construction of a water table map for the storage area. The gradient is towards the northwest in the western portion of the storage area and towards the northeast in the eastern portion of the site.

An additional four monitor wells will be installed, five soil borings will be drilled, and four sediment and four surface water samples will be taken to more clearly define contaminant migration from this site. One monitor well will be placed south of the present Well MW-8, in the assumed upgradient direction. Three wells will be placed downgradient of the storage tanks to intercept a plume if it exists. If feasible, one well will be placed within the area south of the "Y" formed by the drainage culverts as they exit the site to the north. The wells will be installed and sampled as outlined for Site 1.

Five soil borings will be drilled to a total depth of 15 feet each or to the water table. Samples will be taken at $2\frac{1}{2}$ -foot intervals beginning at ground surface. Samples at $2\frac{1}{2}$, 5, and $7\frac{1}{2}$ feet will be analyzed.

As noted in the Phase II, Stage I study, it appears that the ground water surface around the entire site is intercepted by surface drainageways or buried culverts, which act as discharge lines for the upper several feet of the ground water table. Therefore, additional sediment and water samples are warranted from the drainageway/culverts as they exit the fuel storage area. Four sediment and four surface water samples will be taken, beginning at the joint between the drainageways and continuing at 100-foot intervals along the northern route of this system.

The four existing monitor wells will be used for determination of water levels, and samples will be taken for analysis. If floating fuel is encountered in the wells, the fuel product thickness will be measured.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, and oil and grease. In addition, soil moisture determination will be performed on the soil samples.

2.2.5 Site 5: D-4 South Goose Bunker Dump

Three monitor wells, three surface water, and five sediment samples will be used to investigate this site. One monitor well will be positioned outside the site perimeter and consistent with the assumed upgradient direction of ground water flow. Two wells, situated approximately 50 feet from the site perimeter, will be located in the assumed downgradient direction. Because of local topographic features, the exact gradient at this site is uncertain. The intent of the triangular positioning of the wells is to assess both upgradient and downgradient water quality. Wells will be constructed to a total depth no greater than 30 feet, and installation procedures will follow those outlined for Site 1. During the borehole drilling, a maximum of three soil samples will be collected and analyzed. The actual sample locations (borehole and depth) will be at the field supervisor's discretion. From each well, one water sample will be collected and analyzed.

Three surface water samples from the pond/swamp will be collected, as well as a maximum of five sediment samples from the bottom of the pond/swamp area and drainageways that exit this site. These samples will serve to confirm the analyses performed during the Phase II, Stage 1 investigation and to help clarify the pesticide and PCB analyses results.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, oil and grease, pesticides and herbicides, PCBs, phenols, and metals. In addition, soil moisture determination will be performed on the soil samples.

2.2.6 Site 6: D-2 Goose Site Dump

Before field investigations commence, a geophysical survey will be conducted using a metal detector and a magnetometer to locate the dump site drums. To further aid in locating the drums and defining the site location, a detailed examination of available aerial photographs will be performed.

If this site can be located during the planning/mobilization phase of the study, then two soil borings will be drilled to investigate the site. One boring will be located in the immediate vicinity of the drums, and the other boring will be placed at a distance of 25 feet in the assumed downgradient direction. Soil samples will be collected at 2½-foot intervals to a total depth of 10 feet or to the water table. Samples at the ground surface and 2½ feet will be analyzed.

The samples will be analyzed for volatile organics, aromatic compounds, oil and grease, ethylene glycol, and soil moisture determination.

2.2.7 Site 7: D-6 Runway 13 NE Disposal Area

Before field investigations commence, a geophysical survey will be conducted using a metal detector and a magnetometer to define the site boundaries. In addition, a detailed examination of available aerial photographs will be performed.

Three monitor wells will be installed to investigate possible migration of contaminants from this site. Well construction will follow the procedure outlined for Site 1. The wells will be positioned in the field, one in the assumed upgradient and two in the downgradient direction. Sampling procedures will be the same as those for Site 5.

Two soil borings will be drilled to a total depth of 10 feet. Samples will be taken from the ground surface at 2½-foot intervals, extending to 10 feet. Soil samples from the ground surface and the 2½-foot depth will be analyzed.

If surface drainage from the site can be located, one sediment sample and one surface water sample will be collected outside but within 20 feet of the site boundary.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, oil and grease, pesticides and herbicides, PCBs, phenols, and metals. In addition, soil moisture determination will be performed on the soil samples.

2.2.8 Site 8: S-1 Old DPDO Storage Area

Three monitor wells, two soil borings, two surface water samples, and two sediment samples will be used to investigate this site. The three wells will be constructed to a total depth of 30 feet, and installation procedures will follow those outlined for Site 1. Sampling procedures will be the same as those for Site 5. Because of uncertainty about the local gradient at this site, exact positioning of wells will be located in the field, with the intention being to locate one upgradient and two downgradient. The soil borings drilled to a depth of 10 feet will be placed in the centers of the two areas, one in the northeast and one in the southwest quadrant. Soil samples will be analyzed from samples taken at ground surface, $2\frac{1}{2}$, and 5 feet. The surface water and sediment samples will be collected from drainageways at points downstream of the site.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, oil and grease, pesticides and herbicides, PCBs, phenols, and metals. In addition, soil moisture determination will be performed on the soil samples.

2.2.9 Site 9: D-9 Disposal Pit

A geophysical survey will be conducted during the planning/mobilization stage of the study to attempt to locate this site by the response of a metal locator and/or magnetometer to the assumed metallic refuse interred in this pit. A grid system will be constructed and tied into local ground coordinates so that the boundaries of the burial pit can be defined. To further aid in defining the site boundaries, a detailed examination of available aerial photographs will be performed.

If this site can be identified, one monitor well will be installed near the assumed downgradient boundary of the pit. The well will be constructed and installed according to those procedures outlined for Site 1. One water sample will be collected and analyzed.

In addition, one boring will be drilled in the immediate vicinity of contamination. Soil samples will be collected at 2½-foot intervals to a total depth of 10 feet or to the water table. Samples at 2½ feet above and 2½ feet below the water table will be analyzed. Water and soil samples will be analyzed for acetone and picric acid.

2.2.10 Site 10: RD-1 Low-Level Radioactive Waste Disposal

A geophysical survey (metal detector and magnetometer) and a review of available aerial photographs will be performed to accurately locate this disposal area.

If the disposal area can be located, then three monitor wells will be installed, one upgradient and two downgradient. From each well, one water sample will be collected and analyzed. The waste, reported to be buried at a depth of 15 feet and higher elevations, is assumed to be below the water table. The purpose of the well installations is to obtain ground water samples downgradient of the burial trench and analyze for gross alpha, gross beta, and radium-226 and radium-228. The results of analyses of these samples will be compared with the ambient ground water quality and the USEPA drinking water standards for radiation.

3.0 FIELD SETUP

3.1 DETAILED WORK PLAN

3.1.1 Planning

- o Contact MANG and TAC regarding meeting time and place.
- o MANG and TAC contact station POC to establish meeting specifics.
- o Contact surveyor subcontractor regarding survey start date.
- o Contact drilling subcontractor regarding start date.
- o Notify chemistry laboratory subcontractor to prepare bottles (cleaning, preservatives, etc.) and shipping containers.
- o Make travel arrangements.
- o Write purchase orders for drilling subcontractor, surveyor subcontractor, chemistry subcontractor.
- o Assemble and assess condition of all field equipment and supplies.
- o Replace, repair, and supplement field equipment and supplies.
- o Prepare Technical Operations Plan and submit to MANG and TAC.
- o Brief field personnel on Statement of Work (SOW); provide with TOP.
- o Order health and safety equipment.

3.1.2 Mobilization

- o Senior geologist and field engineers mobilize from Chicago; geophysicist mobilizes from Santa Barbara.
- o Survey crew mobilizes from Duluth.
- o Drilling subcontractor mobilizes from Minneapolis.
- o Field equipment is sent from California and Chicago.
- o Field supplies are sent from California and Chicago. Remaining supplies are purchased in Minnesota.
- o Rent vehicles, locate housing.
- o Field equipment, supplies, chemistry bottles, and shipping containers are stored in base temporary office area (SOW, p. 16, III).
- o Decontamination area is tested (i.e., water pressure, electrical hookups, etc.) (SOW, p. 16, III.F).

o Dames & Moore personnel review existing engineering plans, drawings, diagrams, aerial photographs, etc. to evaluate sites to be investigated.

3.1.3 On-Site Setup

- o Senior engineer meets with MANG and TAC officials, base POC, and USAFOEHL Technical Monitor. Statement of Work reviewed; boring locations for wells/borings are discussed, and tentative locations are staked and numbered. Underground utilities are located and access problems resolved.
- o MANG personnel brief Dames & Moore personnel, drilling and surveying crews on rules and regulations involved with working on base. Briefings may involve several meetings, as mobilization of personnel is staggered (geophysics first, drilling and sampling second, survey third).
- o MANG issues personnel identification badges and vehicle passes and/or entry permits.
- Geophysicist is briefed on site-specific conditions for Sites 4, 6, 7, 9, and 10 by consulting with MANG personnel and surveyor. Geophysicist and assistant establish grids for geophysical survey. USAF clearance on work granted.
- Orientation of drilling crew to site conditions, discussion of well/boring locations.
- o Finalizing well/boring locations with base POC. MANG gives clearance and sign-off on digging permits.
- o Senior geologist orients field engineer to site conditions and proposed boring locations.
- o Discussion with base POC regarding handling procedures and 10 percent selection process of samples to be sent to OEHL, San Antonio.
- o Commence drilling operations.

3.2 DAMES & MOORE HEALTH AND SAFETY PLAN

Project Name and Number: Phase II, Stage 2 Installation Restoration Program 01016-267-07

Project Site Location: Duluth International Airport, Duluth, Minnesota

Project Leader: Carol J. Scholl

Site Project Manager and On-Site Safety Officer: Amy D. Lamborg

Plan Preparer: Michael W. Ander

Plan Reviewer: David Dahlstrom

Preparation Date: June 28, 1985

Plan Approvals: Office Safety Coordinator Michael W. Ander (date) Managing Principal-in-Charge Glenn D. Martin (date) Project Manager

(date)

Carol J. Scholl

I. PURPOSE

The purpose of this Plan is to assign responsibilities, establish personnel protection standards, specify mandatory operating procedures, and provide for contingencies that may arise while operations are being conducted at the site.

II. APPLICABILITY

The provisions of the Plan are mandatory for all on-site Dames & Moore employees and subcontractors engaged in hazardous material management activities including but not limited to initial site reconnaissance, preliminary field investigations, mobilization, project operations, and demobilization.

III. RESPONSIBILITIES

A. Site Project Manager (SPM)

The SPM shall direct on-site investigation and operational efforts. At the site, the SPM, assisted by the On-Site Safety Officer, has the primary responsibility for:

- 1. Assuring that appropriate personnel protective equipment is available and properly utilized by all on-site personnel.
- 2. Assuring that personnel are aware of the provisions of this plan, and are instructed in the work practices necessary to ensure safety and planned procedures for dealing with emergencies.
- 3. Assuring that personnel are aware of the potential hazards associated with site operations (see Tables 3-1 and 3-2).
- 4. Monitoring the safety performance of all personnel to ensure that the required work practices are employed.
- 5. Correcting any work practices or conditions that may result in injury or exposure to hazardous substances.
- 6. Preparing any accident/incident reports (see attached Accident Report Form).
- 7. Assuring the completion of Plan Acceptance and Feedback forms attached herein.

TABLE 3-1
EXPOSURE LIMITS AND RECOGNITION QUALITIES

	Exposure	Recognition Qualities		
Compound	Standard ^a	Color	Odor	State
Gasoline	300 ppm	None to pale brown or pink	Gasoline (0.25 ppm) ^b	Liquid
Benzene	l ppm	None	Aromatic	Liquid
Xylene	100 ppm	None	Aromatic	Liquid
Toluene	200 ppm	None	Aromatic	Liquid
Picric Acid ^C	0.1 mg/m ³	None to yellow	Odorless	Solid or liquid
Acetone	1000 ppm	None	Ether-like	Liquid
DDT	1 mg/m ³	None	Weak chemical odor	Solid
Chlorobromomethane	200 ppm	None to pale yellow	Sweet	Liquid
Carbon Tetrachloride	10 ppm	None	Ether-like	Liquid
PCBs	1 mg/m ³	None	Odorless	Liquid
Radium	1x10-12 μCi/ml	White	Odorless	Solid
Ethylene Glycol	50 ppm	None	Odorless	Liquid
Chloroform	50 ppm	None	Sweet	Liquid
Trichloroethylene	100 ppm	None	Sweet	Liquid
1,1,1-Trichloroethane (Methyl Chloroform)	350 ppm	None	Sweet	Liquid
Tetrachloroethylene	100 ppm	None	Sweet	Liquid
1,2-Dichloroethane (Ethylene Dichloride)	50 ppm	None	Sweet	Liquid
1,1-Dichloroethane	100 ppm	None	Sweet	Liquid

aOSHA permissible exposure limit or ACGIH Threshold Limit Value.

bOdor detection threshold.

CDOT designated Class A explosive: possible detonation upon rapid heating or mechanical shock; not a problem if dissolved in water.

SYMPTOMS OF OVEREXPOSURE, POTENTIAL CHRONIC EFFECTS, AND PIRST-AID TREATMENT

	COMPOUND	FYF	SYMPTOMS OF	SYMPTOMS OF OVEREXPOSURE SKIN INGESTION	POTENTIAL CHRONIC EFFECTS
	Gasoline	Irritation	Irritation, drying	Irritation of mucous membranes, dizziness, uncoordination, coughing, gagging.	1
	Benzene	Irritation	Dermatitis	Giddiness, headache, nausea, fatigue, staggering gait.	Aplastic anemia, leukemia.
[Xylene	Irritation	Dermatitis	Dizziness, uncoordination, nausea.	Central nervous system, liver, and kidney damage.
25]	Toluene	1	Dermatitis	Fatigue, confusion, dizziness, headache.	Central nervous system, liver, and kidney damage.
	Picric Acid	Irritation	Dermatitis	Yellow-stained teeth, weakness, bitter taste, gastrointestinal distress, nephritis.	Kidney, liver, blood, skin, and eye damage.
	Acetone	Irritation	Dermatitis	Irritation of nose and throat, dizziness.	Respiratory system and skin damage.
	DDT	Irritation	Irritation	Paresthesias of tongue, lips, and face, tremors, apprehension, dizziness, confusion, headache, malaise, vomiting, partial paralysis of hands.	Central nervous system, kidney, liver, skin, and peripheral nervous system damage.

TABLE 3-2 (continued)

	COMPOUND	EYE	SYMPTOMS OF SKIN	SYMPTOMS OF OVEREXPOSURE SKIN INHALATION/INGESTION	POTENTIAL CUBONIC BEECTS
	Chlorobromomethane	Irritation	Irritation	Disorientation, dizziness, irritation of throat, pulmonary edema.	Skin, liver, kidney, respiratory system, lung, and central nervous system damage.
	Carbon Tetrachloride	I	Irritation	Central nervous system depressant, nausea, vomiting.	Central nervous system, eye, lung, liver, kidney, and skin damage.
	PCBs	١	Chloracne	Nausea, vomiting, loss of weight, jaundice, edema, abdowinal pain.	Liver and skin damage.
[26]	Radium	1	}	1	Lung cancer, bone cancer, osteitis, skin damage, blood dyscrasias.
	Ethylene Glycol	Irritation	Irritation	Initial central nervous system stimulation followed by depression.	Kidney damage.
	Chloroform	Irritation	Irritation	Dizziness, mental dullness, headache, nausea, anesthesia, fatigue.	Liver, kidney, heart, eye, and skin damage.
	Trichloroethylene	Irritation	Dermatitis	Headache, vertigo, tremors, somnolence, nausea, vomiting, cardiac arrhythmias, paresthesias.	Respiratory system, heart, liver, kidneys, central nervous system, and skin damage.
	Tetrachloroethylene	Irritation	I	Irritation of nose and throat, nausea, flushed face and neck, vertigo, uncoordination, erythemia.	Liver, kidney, eye, upper respiratory system, and central nervous system damage.

TABLE 3-2 (continued)

		SYMPTOMS OF	SYMPTOMS OF OVEREXPOSURE	
COMPOUND	EYE	SKIN	INHALATION/INGESTION	POTENTIAL CHRONIC EFFECTS
l,l-Dichloroethane	I	Irritation	Central nervous system depression, drowsiness, unconsciousness.	Skin, liver, and kidney damage.
l,l,l-Trichloroethane (Methyl Chloroform)	Irritation	Dermatitis	Headache, lassitude, central nervous system depression, poor equilibrium, cardiac arrhythmias.	Skin, central nervous system, eye, and cardio- vascular system damage.
1,2-Dichloroethane (Ethylene Dichloride)	Irritation	Dermatitis	Central nervous system depression, nausea, vomiting, corneal opacity.	Kidney, liver, eye, skin, and central nervous system damage.

GENERAL FIRST-AID TREATMENT

Eye -- Irrigate immediately.
Skin -- Soap wash promptly.
Inhalation -- Move to fresh air.
Ingestion -- Get medical attention.

ACCIDENT REPORT FORM

Si	UPERVISOR'S REPORT OF			OO NOT USE FOR MO OR AIRCRAFT ACCID	TOR VEHICLE SENTS
10		FROM			
TELEPHONE (include area code)					
NAME OF INJURED OF	R ILL EMPLOYEE				
DATE OF ACCIDENT	TIME OF ACCIDENT	EXACT LOCATION OF	ACCIDEN		
NARRATIVE DESCRIP	ION OF ACCIDENT	!			
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PROBABLE DISABILI	Y (check one)				
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CORRECTIVE ACTION	TAKEN BY REPURITING UN.	11			
CURRECTIVE ACTION	THAT REMAINS TO BE TAN	KEN (by whom and by	when)		
NAME OF SUPERVISOR		TIT	LE	······································	
SIGNATURE		DA1	Ε		
J					

FORM #IHST-1

REVIEW RECEIPT

PROJECT HEALTH AND SAFETY PLAN

 $\begin{array}{lll} \textbf{Instructions:} & \textbf{This form is to be completed by each person to work on the site and returned to the Program Director-Industrial Hygiene and Safety.} \\ \end{array}$

Job No.	01016-267-07		
Project:	Phase II, Stage 2 Environmental Duluth International Airport, Min		
Rev. No.	0_	Date <u>06/28/85</u>	
	that I have read and understa rform my work in accordance wi	and the contents of the above th it.	plan an
		Signed	
		Date	

PLAN FEEDBACK FORM

Problems with plan requirements:
·
Unexpected situations encountered:
Recommendations for future revisions:

PLEASE RETURN TO THE FIRMWIDE HEALTH AND SAFETY OFFICE - NY

B. Project Personnel

Project personnel involved in on-site investigations and operations are responsible for:

- 1. Taking all reasonable precautions to prevent injury to themselves and to their fellow employees.
- 2. Implementing Project Health and Safety Plans, and reporting to the SPM for action any deviations from the anticipated conditions described in the Plan.
- 3. Performing only those tasks that they believe they can do safely, and immediately reporting any accidents and/or unsafe conditions to the SPM.

IV. BACKGROUND

A. Site History

Based on preliminary site evaluation of Duluth International Airport (IAP), Minnesota, there appear to be ten (10) areas that may have generated significant environmental contamination over the lifetime of the facility. Suspected contaminants have been identified, and at some sites a preliminary estimate of concentrations has been made. Dames & Moore anticipates that site conditions are such that only relatively low levels of contaminants may be encountered during the proposed drilling and soil and water sampling.

Site I: D-1 Goose Site Dump -- Potential contaminants at this site include DDT (and its breakdown product, DDD) and PCBs. The Phase I report noted that approximately 15 empty 20% DDT drums were observed at the site. Soil and water analyses conducted during the Phase II, Stage 1 investigation found low levels of DDD and the PCB compound Arochlor-1260.

Site 2: FT-1 and FT-2 Fire Training Areas -- During fire training exercises at these sites, 300 to 1000 gallons of flammable materials were placed in pits, ignited, and extinguished with a protein-based foam, AFFF, or chlorobromomethane. Carbon tetrachloride may also have been used during the early years of pit operation. Materials burned included JP-4, waste oils, paint thinners, and solvents. Area FT-1 was in use from 1951 to the early 1960s. Activities then were switched to Area FT-2 and continue to the present time.

- Site 3: S-2 DPDO Storage Area "C" -- Waste POL, waste solvents, and chemicals were stored in Area "C" of the DPDO Storage Site S-2 from 1965 to 1980. Although minor drum leaks have occurred, no major spills have been recorded. The Phase II, Stage I investigation at this site found the following chemicals in soil at the site at or below the given concentrations: oil and grease (50 mg/g), chloroform (0.315 μ g/g), trichloroethylene (0.940 μ g/g), trichloroethane (0.210 μ g/g), bromochloromethane (0.016 μ g/g), dibromochloromethane (0.003 μ g/g), dichloroethylene (0.037 μ g/g), and dichloroethane (0.018 μ g/g).
- Site 4: SP-1 Tank Farm Area -- The tank farm facility consists of three above-ground fuel storage tanks, fuel loading docks, associated outbuildings, and two small buried tanks, one for fuel oil and one holding tank for waste oil. During repair of a water line in 1980, diesel fuel No. 2 was observed at a depth of 6 to 7 feet. The fuel is believed to have originated from a leak in Tank No. 3 or its feeder line.
- Site 5: D-4 South Goose Bunker Dump -- Two empty drums of unknown origin were found at this site along with some miscellaneous trash. The Phase I report stated that water samples from this site were analyzed but no contaminants were detected.
- Site 6: D-2 Goose Site Dump -- Approximately 10 empty and rusty 55-gallon drums of deicing agent (ethylene glycol) were observed at this site in October 1981. No other waste materials are known to be present.
- Site 7: D-6 Runway 13 NE Disposal Area -- General rubbish, hardfill, aircraft parts, empty drums, and possibly drums containing unburnable and unrecoverable chemicals are believed to have been disposed of at this less-than-1-acre site. No leachate has been observed, although there is a potential for leachate generation due to the shallow water table.
- Site 8: S-1 Old DPDO Storage Area -- Materials handled through the DPDO Storage Area during the period from 1950 through 1964 included DDT drums, waste fuel oil/solvents, and PCB transformers (Engineering-Science, 1982). There is a potential for leakage of drums to have caused contamination at this site.

Site 9: D-9 Disposal Pit -- A small pit at this site, approximately 7 by 8 feet, was used during the mid-1960s for the disposal of small amounts of picric acid and acetone from the medics clinic. Small amounts of garbage were also disposed of here. The exact location of the pit is unknown.

Site 10: RD-1 Low-Level Radioactive Waste Disposal -- During the 1950s, low-level radioactive materials such as cathode ray tubes, scopes, and instrument dials were deposited in a 15-foot deep trench approximately 40 feet long. General refuse and garbage covered the radioactive wastes, and local soil was used to cap the pit. The three radionuclides most commonly used for instrument dials were radium-226, promethium-147, and tritium.

B. Dames & Moore Activity

Dames & Moore will be conducting the following activities at Duluth IAP:

1. Site 1: D-1 Goose Site Dump

- a. Drill and construct a maximum of four monitor wells. Position three of the wells at the site perimeter consistent with the assumed downgradient direction of ground water flow. To collect ambient water quality information, place the fourth well outside the site perimeter consistent with the assumed upgradient direction of ground water flow. Collect one ground water sample from each monitor well. During the borehole drilling, collect a maximum of four soil samples for laboratory analysis.
- b. Drill one soil boring in the suspected zone of contamination and collect soil samples from the ground surface and at each $2\frac{1}{2}$ -foot interval until the estimated final borehole depth of 10 feet is reached. Analyze the samples from the surface and at the $2\frac{1}{2}$ and 5-foot depths.
- c. Designate two sampling points from surface waters located at the site, or from surface waters adjacent to and downstream of the site.
- d. Collect both a water sample and a bottom sediment sample from each of these surface water sample points.

e. Analyze all soil and water samples for volatile organics (USEPA 601 and SW 8010), aromatic compounds (E 602 and SW 8020), oil and grease (USEPA 413.2), pesticides (E 608 and SW 3550 and 8080), herbicides (E 615 and SW 8150), polychlorinated biphenyls (PCBs) (E 608 and SW 3550 and 8080), phenols (E 420.2 and E 420.2 modified), arsenic (E 206.2 and SW 3050 and 7060), barium (E 208.2 and SW 3050 and 6010), cadmium (E 213.2 and SW 3050 and 6010), chromium (E 218.1 and SW 3050 and 6010), lead (E 239.2 and SW 3050 and 6010), mercury (E 245.1 and SW 7471), selenium (E 270.3 and SW 3050 and 7740), and silver (E 272.2 and SW 3050 and 6010).

2. Site 2: FT-1 Fire Training Area (1951 to Early 1960s) and FT-2 Fire Training Area (Early 1960s to Present)

- a. Drill and construct a maximum of five monitor wells. Position one well consistent with the assumed upgradient direction of ground water flow. Use information from this well to establish ambient water quality. Place four wells in the assumed downgradient direction of ground water flow: two between FT-1 and FT-2 on either side of the access road, and two north of FT-2. Collect one ground water sample from each monitor well. During the borehole drilling, collect a maximum of five soil samples for laboratory analysis.
- b. Drill two soil borings in FT-1 and one soil boring in FT-2. Locate each boring in the center of a burn pit. If the second and older burn pit in FT-1 cannot be defined through aerial photographs or a physical site inspection, only drill one boring in FT-1. Collect soil samples from the ground surface and at each 2½-foot interval until the estimated final borehole depth of 10 feet is reached. Analyze the samples from the ground surface and the 2½- and 5-foot depths.
- c. Designate sampling points in the drainageway between the western extension of the access road and the southwestern boundary of FT-2. Collect two surface water samples and two bottom sediment samples from this drainageway.
- d. Collect one surface sediment sample and one surface water sample from the swamp to the north and downgradient of FT-2.

- e. Collect one ground water sample from each of the six existing monitor wells at this site.
- f. Analyze all water and soil samples for volatile organics (USEPA 601 and SW 8010), aromatic compounds (E 602 and SW 8020), oil and grease (USEPA 413.2), and phenols (E 420.2 and E 420.2 modified).

3. Site 3: S-2 DPDO Storage Area "C"

- a. Drill and construct a maximum of four monitor wells. The positioning and soil and water sampling follow that specified for Site 1.
- b. Drill three soil borings positioned along a centerline running north to south in the storage area. Follow the soil sampling plan specified for Site 1.
- c. Designate sampling points in the drainageway that begins on the east side of the storage area and then heads in a northeasterly direction. Collect three surface water samples and three bottom sediment samples from this drainageway. Collect the first sediment and water samples in the approximate location of Sample 2 identified in the Stage 1 study. Subsequent sample points should be at 100-foot intervals downgradient along the drainageway.
- d. Analyze all water and soil samples as specified for Site 1.

4. Site 4: SP-1 Tank Farm Area

- a. Perform a geophysical survey using a metal detector and a magnetometer to precisely locate underground pipes. Perform an electromagnetic survey to identify leak sites from these pipes. Survey the entire tank farm to include a minimum 50-foot buffer around the site perimeter. Expand the geophysical survey on the southern side of the tank farm area to the main access road. A former fueling facility is located south of the tank farm.
- b. Drill and construct a maximum of four monitor wells. The well positioning and soil and water sampling follow that specified for Site I.

- o. Drill five soil borings, positioning them based on the geophysical survey results and the data generated during the Stage 1 study. Boring depth is estimated to be 15 feet; however, drill until the water table is reached. Collect soil samples at 2½-foot intervals beginning at ground surface. Analyze the samples collected at 2½-, 5-, and 7½-foot depths.
- d. Designate sample points in the drainageways/culverts around the site. Of particular interest is the drainageway heading north to Beaver Creek. Collect four surface water and four sediment samples from the drainageways/culverts.
- e. Collect one round of ground water samples from the four existing monitor wells at this site.
- f. Analyze all water and soil samples for volatile organics (USEPA 601 and SW 8010), aromatic compounds (E 602 and SW 8020), and oil and grease.

5. Site 5: D-4 South Goose Bunker Dump

- a. Drill and construct three monitor wells. Position two of the wells approximately 50 feet from the site perimeter and consistent with the assumed downgradient direction of ground water flow. Place the other monitor well outside the site perimeter and consistent with the assumed upgradient direction of ground water flow. Collect one ground water sample from each monitor well. During the borehole drilling, collect a maximum of three soil samples for laboratory analysis.
- b. Collect three surface water samples from the pond/swamp at this site.
- c. Collect a maximum of five sediment samples from the bottom of the pond/swamp area and drainageways that exit this site.
- d. Analyze all water and soil samples as specified for Site 1.

6. Site 6: D-2 Goose Site Dump

a. Perform a geophysical survey using a metal detector and a magnetometer to locate the dump site drums. Also conduct a detailed examination of available aerial photographs for the same purpose.

- b. If the geophysical survey and aerial photographs cannot locate the drums and accurately define the site location, perform no more work.
- c. If the site can be located, drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at 2½-foot intervals until the estimated final borehole depth of 10 feet is reached. Analyze the samples from the surface and at 2½ feet.
- d. Analyze all soil samples for ethylene glycol (NIOSH P and CAM 338), oil and grease (USEPA 413.2), volatile organics (USEPA 601 and SW 8010), and aromatic compounds (E 602 and SW 8020).

7. Site 7: D-6 Runway 13 NE Disposal Area

- a. Perform a geophysical survey using a metal detector and magnetometer to define as accurately as possible the site boundaries. Also conduct a detailed examination of available aerial photographs for the same purpose.
- b. Drill and construct three monitor wells. The positioning and soil and water sampling follow that specified for Site 5.
- c. Drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at 2½-foot intervals until the estimated final borehole depth of 10 feet is reached. Analyze the samples from the surface and at the 2½-foot depth.
- d. If surface drainage from the site can be located, collect one bottom sediment and one surface water sample outside but within 20 feet of the site boundary.
- e. Analyze all water and soil samples as specified for Site 1.

8. Site 8: S-1 Old DPDO Storage Area

a. Drill and construct three monitor wells. The positioning and soil and water sampling follow that specified for Site 5.

- b. Drill two exploratory soil borings, one in the center of each of the two former storage area sites. The soil sampling plan follows that specified for Site 1.
- c. Collect two surface water and two bottom sediment samples from drainageways at points downstream of the site.
- d. Analyze all water and soil samples as specified for Site 1.

9. Site 9: D-9 Disposal Pit

- a. Perform a geophysical survey using a metal detector and a magnetometer to locate the site. Also conduct a detailed examination of available aerial photographs for the same purpose.
- b. If the geophysical survey and aerial photographs cannot accurately define the site location, perform no more work.
- c. If the site can be located, drill one exploratory soil boring in the zone of contamination. Collect soil samples at 2½-foot intervals and analyze the samples at 2½ feet above and below the water table.
- d. If the site can be located, drill and construct one monitor well at the site perimeter consistent with the assumed downgradient direction of ground water flow. Collect one ground water sample.
- e. Analyze all water and soil samples for acetone (ASTM D 3695-82) and picric acid (USATHAMA 2B and 2C).

10. Site 10: RD-1 Low-Level Radioactive Waste Disposal

- a. Conduct a geophysical survey (metal detector and magnetometer) and review aerial photographs to accurately locate the site.
- b. Drill and construct three monitor wells. Position two of the wells at the site perimeter consistent with the assumed downgradient direction of ground water flow. Place the third well in the assumed upgradient direction of ground water flow to collect ambient water quality information. Do not analyze

soil samples from these boreholes. Collect one water sample from each well.

c. Analyze all water samples for gross alpha (Standard Methods, 16th ed., 703), gross beta (Standard Methods, 16th ed., 703), radium-226 (EPA-600/4-80-032, 903.0) and radium-228 (EPA-600/4-80-032, 904.0).

C. Suspected Hazards

There is a potential for exposure to the chemicals listed in Tables 3-1 and 3-2. Because past analyses have indicated that the chemicals, if present, are at very low concentrations, and because Dames & Moore will not be drilling directly in the areas of waste disposal but only upgradient and downgradient, it is expected that the potential exposures will be at very low concentrations. Picric acid is a DOT designated Class A explosive that is subject to possible detonation upon rapid heating or mechanical shock; this is not a problem if it is dissolved in water.

V. EMERGENCY CONTACTS AND PROCEDURES

Should any situation or unplanned occurrence require outside or support services, the appropriate contact from the following list should be made:

Agency	Person to Contact		Telephone
D&M Project Leader	Amy Lamborg	(office) (home)	312-297-6120 312-328-0671
D&M Industrial Hygiene and Safety Director	David Dahlstrom	(office) (home)	404-262-2915
Police	MANG		218-723-7280
Fire	MANG		218-723-7233
Emergency	Commercial Ambulance		218-722-0807
Safety		•	
TAC Clinic	Sgt. Suzanne Grage		218-723-7224
Civil Engineering	Capt. Gary Niemi	(office)	218-723-7339

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- o Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on scene.
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

The following emergency procedures should be followed:

- a. In the event that any member of the field crew experiences any adverse effects or symptoms of exposure while on scene, the entire field crew should immediately halt work and act according to the instructions provided by the SPM.
- b. The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team and reevaluation of the hazard and the level of protection required.
- c. In the event that an accident occurs, the SPM is to complete an Accident Report Form for submittal to the MPIC of the office, with a copy to the Health and Safety Program Office. The MPIC should assure that followup action is taken to correct the situation that caused the accident.
- VI. HAZARD CHARACTERISTICS, MONITORING METHODS, AND PROTECTION REQUIRED

Exposure Limits and Recognition Qualities

Information concerning exposure limits and recognition qualities of the contaminants that are suspected to be on site is presented in Table 3-1.

Symptoms of Overexposure, Potential Chronic Effects and First Aid Treatment

Symptoms of overexposure to the suspected contaminants, potential chronic effects of these substances, and first aid treatment information are presented in Table 3-2.

Monitoring Methods, Action Levels and Protective Measures

Methods for monitoring for suspected contaminants, action levels, and protective measures to be used for various contaminant concentration levels are presented in Table 3-3.

TABLE 3-3

HAZARD MONITORING METHOD, ACTION LEVELS, AND PROTECTIVE MEASURES

Hazard	Monitoring Method	Action Level	Protective Measures
Explosive Atmosphere	Explosimeter or Combustible	< 10% LEL	Continue working
Aunosphere	Gas Meter	10 - 25% LEL	Continue working with continuous monitoring
		> 25% LEL	EVACUATE the area; EXPLOSION HAZARD
Organic	Photoionization Detector (HNU)	< 50 ppm	Continue working
Vapors	perector (nino)	50 - 1000 ppm	Continue working with half-face respirator with organic vapor cartridges
		> 1000 ppm	EVACUATE the area

Protective Equipment Required for On-Site Activities

The protective equipment required may vary, depending on the concentrations and dispersion of contaminants encountered during each phase of the work. Table 3-4 specifies protective equipment required for each on-site activity.

TABLE 3-4

PROTECTIVE EQUIPMENT REQUIRED FOR ON-SITE ACTIVITIES

Activity/Location	Protective Equipment
During drilling and sampling	Half-face respirator with organic vapor cartridges*
	Nitrile gloves
	Rubber boots (steel toed)
	Hard hat with splash shield
	Disposable Tyvek coveralls

^{*}If photoionization detector reading is greater than 50 ppm.

ATTACHMENT 1

PROTECTIVE EQUIPMENT

I. INTRODUCTION

When field investigation activities are conducted where atmospheric contamination is known or suspected to exist, where there is a potential for the generation of vapors or gases, or where direct contact with toxic substances may occur, equipment to protect personnel must be worn. Respirators are used to protect against inhalation and ingestion of atmospheric contaminants. Protective clothing is worn to protect against contact with and possible absorption of chemicals through the skin. In addition to protective clothing and respiratory protection, safe work practices must be followed. Good personal hygiene practice prevents ingestion of toxic materials.

Personnel equipment to be used has been divided into two categories commensurate with the degree of protection required, namely Levels C and D protection.

II. LEVELS OF PROTECTION

A. Level C

1. Personal Protective Equipment

- o Air-purifying respirator (MSHA/NIOSH approved)
- o Disposable chemical resistant coveralls
- o Gloves, outer, working gloves
- o Gloves, inner, chemical resistant
- o Boots, steel toe and shank
- o Hard hat (face shield)
- o Rubber boots, outer, chemical resistant (disposable)

2. Criteria for Selection

- a. Air concentrations of identified substances are such that reduction to at or below the substance's exposure limit is necessary and the concentration is within the service limit of the cartridge.
- b. Atmospheric contaminant concentrations do not exceed the Immediately Dangerous to Life or Health (IDLH) levels.

- c. Contaminant exposure to unprotected areas (head and neck) are within skin exposure guidelines, or dermal hazards do not exist.
- d. Job functions have been determined not to require a higher level of protection.

B. Level D

1. Personal Protective Equipment

- o Coveralls
- o Boots/shoes, safety or chemical resistant, steel toe and shank
- o Boots, outer (chemical resistant disposables)
- o Hard hat (face shield)
- o Gloves

2. Criteria for Selection

- a. No indication of any atmospheric hazards.
- b. Work function precludes dusting, splashes, immersion, or potential for exposure to any chemicals.

3. Guidance on Selection Criteria

- a. Level D protection is primarily a work uniform and should not be worn in any area where the potential for contamination exists.
- b. In situations where respiratory protection is not necessary, but site activities are needed, chemical resistant garments — high quality or disposable — must be worn.

III. RESPIRATORY PROTECTION

The following procedures should be used for respiratory protection:

- A. Inspect all washers, diaphragms, and facepiece-to-face seal area for any tears, pinholes, deformation, or brittleness. Should any of these exist, use a different respirator.
- B. Place the respirator on the face, tighten and use both a positive and a negative pressure test, prior to entering the site, to assure a proper fit. Checking for proper fit involves the following:

1. Negative Pressure Test

Close off the inlet opening of the cartridge or the breathing tube by covering it with the palm of the hand or by replacing the tap seal. Gently inhale so that the facepiece collapses slightly, and hold the breath for 10 seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is satisfactory.

2. Positive Pressure Test

Remove the exhalation valve cover. Close off the exhalation valve with the palm of the hand. Exhale gently so that a slight positive pressure is built up in the facepiece. If no outward leakage of air is detected at the periphery of the facepiece, the face fit is satisfactory. (Note: With certain devices, removal of the exhaust valve cover is very difficult, making the test almost impossible to perform.)

ATTACHMENT 2

DAMES & MOORE STANDARD OPERATING PROCEDURES

WORK PRACTICES

- 1. Smoking, eating, drinking, and chewing tobacco are prohibited in the contaminated or potentially contaminated area.
- 2. Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment or ground. Do not place monitoring equipment on potentially contaminated surface (i.e., ground, etc.).
- 3. All field crew members should make use of their senses (all senses) to alert them to potentially dangerous situations (i.e., presence of strong and irritating or nauseating odors).
- 4. Prevent, to the extent possible, spillages. In the event that a spillage occurs, contain liquid if possible.
- 5. Prevent splashing of the contaminated materials.
- 6. Field crew members shall be familiar with the physical characteristics of investigations, including:
 - o wind direction
 - o accessibility to associates, equipment, vehicles
 - o communication
 - o hot zone (areas of known or suspected contamination)
 - o site access
 - o nearest water sources
- 7. The number of personnel and equipment in the contaminated area should be minimized consistent with site operations.
- 8. All wastes generated during D&M and/or subcontractor activities on site should be disposed of as directed by the Field Activity Leader.

HALF-FACE RESPIRATORS

Inspection Procedure

- 1. Look for breaks or tears in the headband material. Also stretch to check the elasticity.
- 2. Make sure all headbands, fasteners, and adjusters are in place and not bent.
- 3. Check the facepiece for dirt, cracks, tears, or holes. The rubber should be flexible, not stiff.
- 4. Look at the shape of the facepiece for possible distortion that may occur if the respirator is not protected during storage.
- 5. Check the exhalation valve located near the chin between the cartridges by the following:
 - Unsnap the cover;
 - Lift the valve and inspect the seat and valve for cracks, tears, dirt, and distortion; and
 - Replace the cover. It should spin freely.
- 6. Check both inhalation valves (inside the cartridge holders). Look for same signs as above.
- 7. Check the yoke for cracks.
- 8. Make sure the cartridge holders are clean. Make sure the gaskets are in place and the threads are not worn. Also look for cracks and other damage.
- 9. Check the cartridges for dents or other damage, especially in the threaded part.

Donning Procedure

1. Screw the cartridge into the holder hand-tight so there is a good seal with the gasket in the bottom of the holder, but don't force it. If the cartridge won't go in easily, back it out and try again.

Always use cartridges made by the same manufacturer who made the respirator.

- 2. Place the facepiece over the bridge of your nose and swing the bottom in so that it rests against your chin.
- 3. Hold the respirator in place and fasten the top strap over the crown of your head.
- 4. Fit the respirator on your face and fasten the strap around your neck. Don't twist the straps. Use the metal slide to tighten or loosen the fit, but not too tight.

5. Test the fit by:

- Lightly covering the exhalation valve with the palm of your hand. Exhale. If there is a leak, you will feel the air on your face.
- Covering the cartridges with the palms of your hands. Again, don't press too hard. Inhale. The facepiece should collapse against your face.
- If there is a leak with either test, adjust the headbands or reposition the facepiece and test until no leakage is detected.

Sanitizing Procedure

- 1. Remove all cartridges, plugs, or seals not affixed to their seats.
- 2. Remove elastic headbands.
- 3. Remove exhalation cover.
- 4. Remove speaking diaphragm or speaking diaphragm/exhalation valve assembly.
- 5. Remove inhalation valves.
- 6. Wash facepiece and breathing tube in cleaner/sanitizer powder mixed with warm water, preferably at 120° to 140°F. Wash components separately from the facemask, as necessary. Remove heavy soil from surfaces with a hand brush.

- 7. Remove all parts from the wash water and rinse twice in clean warm water.
- 8. Air dry parts in a designated clean area.
- 9. Wipe facepieces, valves, and seats with a damp lint-free cloth to remove any remaining soap or other foreign materials.

MONITORING EQUIPMENT INSTRUCTIONS

A. Combustible Gas Indicators (CGIs)/Explosimeters

In addition to the instructions found below, all CGIs should be calibrated prior to use, in an uncontaminated, fresh air environment. Furthermore, units incorporating an aspirator bulb or other air-drawing device should be checked for leaks in the following manner:

- o Attach all hoses, probes, and other air-drawing devices to CGI.
- o Place a finger over probe or hose end.
- o Operate pump or squeeze aspirator bulb.

In a leak-free system, bulb remains collapsed or pump labors. In a leaking system, bulb regains its shape or pump does not labor.

- 1. MSA Explosimeter Combustible Gas Indicator
 - a. Turn explosimeter on by lifting end of "ON-OFF" bar on "RHEOSTAT" knob and rotating "RHEOSTAT" knob clockwise 1/4 turn.
 - b. Flush instrument with fresh air by squeezing and releasing aspirator bulb about five times.
 - c. Rotate "RHEOSTAT" knob until meter needle rests at zero (Avoid large clockwise rotation, which sends large current through filament, perhaps shortening its useful life.)
 - d. To sample, place hose or probe end in atmosphere to be measured and operate aspirator bulb about five times.
 - e. Read percent of lower explosive limit (LEL) as meter needle fluctuates from a steady-state level to a higher level each

time the aspirator bulb is flexed. The steady-state reading indicates the "true" value.

f. Turn explosimeter off by lifting end of "ON-OFF" bar on "RHEOSTAT" knob and rotating it counterclockwise until it "clicks." "ON-OFF" bar retracts into "RHEOSTAT" knob.

B. Photoionization Detector

- 1. Before attaching the probe, check the function switch on the control panel to make sure it is in the off position.
- 2. Attach the probe by plugging in the 12-pin plug to the interface on the readout module.
- 3. Turn the 6-position function switch to the battery check position. The needle on the meter should read within or above the green battery arc on the scale. If not, recharge the battery. If the red indicator comes on, the battery should be recharged.
- 4. Turn the function switch to any range setting. Look into the end of the probe briefly to see if the lamp is on. If it is on, it will give a purple glow. Do not stare into the probe for any length of time, as UV light can damage your eyes. The instrument is now ready for operation.
- 5. To zero the instrument, turn the function switch to the standby position and rotate the zero potentiometer until the meter reads zero. Clockwise rotation of the span pot produces a downscale deflection, while counterclockwise rotation yields an upscale deflection. Note: No zero gas is needed, since this is an electronic zero adjustment. If the span adjustment setting is changed after the zero is set, the zero should be rechecked and adjusted, if necessary. Wait 15 to 20 seconds to ensure that the zero reading is stable. If necessary, readjust the zero.
- 6. Turn function switch to the 0-20, 0-200, or 0-2000 position.
- 7. Place probe in the atmosphere to be monitored. If the needle moves to the upper limit of the scale, change the function switch to the next position.

ENVIRONMENTAL SAMPLES

Environmental samples must be packaged and shipped according to the following procedure:

1. Packaging

- a. Place sample container, properly identified and with a sealed lid, in a polyethylene bag, and seal bag.
- b. Place sample in a fiberboard container or metal picnic cooler that has been lined with a large polyethylene bag.
- c. Pack with enough noncombustible, absorbent, cushioning material to minimize the possibility of the container breaking.
- d. Seal large bag.
- e. Seal or close outside container.

Environmental samples may also be packaged following the procedures outlined later for samples classified as "flammable liquids" or "flammable solids." Requirements for marking, labeling, and shipping papers do not apply.

2. Marking/Labeling

Sample containers must have a completed sample identification tag, and the outside container must be marked "Environmental Sample." The appropriate side of the container must be marked "This End Up," and arrows should be drawn accordingly. No DOT marking and labeling is required.

3. Shipping Papers

No DOT shipping papers are required.

4. Transportation

There are no DOT restrictions of mode of transportation.

3.3 SUBCONTRACTOR INFORMATION

3.3.1 Chemistry Subcontractor

UBTL, Inc.
520 Wakara Way
Salt Lake City, Utah 84108
Telephone: 801/584-3232

3.3.2 Surveying Subcontractor

Jack D. Salo Inc. 15 East First Street Duluth, Minnesota 55802 Telephone: 218/727-8796

3.3.3 <u>Drilling Subcontractor</u>

Braun Engineering Testing, Inc. 6800 South County Road 18 P. O. Box 35108 Minneapolis, Minnesota 55435-0108 Telephone: 612/941-5600

4.0 CALIBRATION OF FIELD EQUIPMENT

All field equipment will be calibrated according to the manufacturers' specifications, as described below. The personnel assigned to take measurements in the field will assemble as much equipment as feasible in the laboratory prior to mobilization to the site. The personnel will become familiar with the calibration of all instruments, as outlined in the respective manuals, and will make all calibrations that can be made at that time. Pertinent sections of the respective manuals will be photocopied for reference in the field, and all equipment that will be necessary for field calibration, such as buffer solutions and calibration gases, will be assembled.

LIST OF FIELD EQUIPMENT

- 4.1 Electromagnetics Terrain Conductivity Meter
- 4.2 Magnetometer
- 4.3 Metal Locator
- 4.4 Hand Pump
- 4.5 Total Organic Vapor Analyzer
- 4.6 Explosimeter
- 4.7 Conductivity Meter
- 4.8 pH Meter
- 4.9 Thermometer (Thermocouple)
- 4.10 Bailers
- 4.11 Decontamination Supplies
- 4.12 Respirators, Cartridges, and Filters
- 4.13 Locks

4.1 ELECTROMAGNETICS TERRAIN CONDUCTIVITY METER

The Geonics EM-31D is a one-man instrument consisting of a control unit and transmitter and receiver coils. The system permits measurements of terrain conductivity to be made without the need for direct earth coupling and to an effective depth of exploration of 20 feet. The EM-31D is equipped for output to a digital data logger. The instrument requires no field calibration or adjustment.

Verification of system repeatability is obtained by residing at a calibration station at the start, middle, and end of each survey day. Normally, readings should fall within a range of 10 percent; however, changes in soil moisture content (e.g., following a prolonged period of rain) may affect the natural reading value.

4.2 MAGNETOMETER

The EDA OMNI proton precision magnetometer is a microprocessor-based unit capable of reading total magnetic field intensity and vertical magnetic gradient. The OMNI-IV consists of two parts: one is the reading/recording module, and the other is the sensor. These are interconnected by cable.

Proper system operation is tested at the start of a field investigation and before each field day of recording in accordance with the procedures detailed in the Instrument Operations Manual. Using the "TEST" and "DUMP" modes, the following tests are made:

- o Total field test;
- o Error calculation test; and
- o Software diagnostics.

In the course of the "total field test," approximately 85 percent of the OMNI-IV electronics are tested. As a result of this test, there is an 80 percent probability that the OMNI-IV is operating satisfactorily. Further verification of system performance is obtained by comparing the total field intensity value obtained at the base station with published iso-intensity maps of the total intensity of the earth's magnetic field.

4.3 METAL LOCATOR

The Discovery Electronics TF-600 is a ground-reject metal locator capable of screening out spurious responses produced by metal litter and variations in soil conditions. The TF-600 requires that an instrument nulling procedure be followed to optimize survey results. This is accomplished at the start of a survey using the mode selector and two nulling controls present on the instrument panel, following the procedures prescribed in the Instrument Operations Manual. Frequently, once set, the nulling controls need not be changed throughout the course of the entire survey. As a standard practice, the nulling process is performed at the start of each survey day.

Systems performance is verified by passing the TF-600 over a visible metallic object and noting the tone response of the instrument.

4.4 HAND PUMP

A Brainard-Kilman 1.7-inch hand pump will be used for well development and purging. This is a PVC pump with a 2.75-gpm pumping rate. An external power source is not required to operate this manual pump. The only calibration applicable

for this type of equipment is an initial measurement of the length and internal diameter of the pump piping to confirm the stated volume capacity. Prior to use, the threads and check valve will be inspected to ensure a tight seal. The performance of the "O" ring seal will also be tested. During purging, the evacuated water will be placed in containers to determine the volume of water removed.

4.5 TOTAL ORGANIC VAPOR ANALYZER

The analyzer used will be an HNU Model P1-101. The HNU is a quantitative instrument that measures the total concentration of numerous organic vapors in the air. The instrument is used primarily as a safety or screening device to determine the presence and concentration of organic vapors. The HNU is battery operated and lightweight, making it very useful in actual field monitoring projects. The instrument is calibrated by introducing pressurized gas from a cylinder with a known organic concentration into the detector. Once the concentration has stabilized, the display of the instrument is adjusted to match the known concentration. A calibration of this type is performed prior to each usage of the instrument. If the output differs greatly from the known concentration, the initial procedure to remedy the problem is a thorough cleaning of the instrument. The cleaning process normally removes foreign materials that affect the calibration of the instrument. If this procedure does not remedy the problem, further troubleshooting is performed until the problem is resolved. If the problem cannot be resolved by Dames & Moore technicians, the instrument is returned to the manufacturer for repair.

4.6 EXPLOSIMETER

An MSA Model 2A explosimeter will be used to determine the presence of explosive gases or vapors in ambient air. The instrument is used primarily as a safety device to determine whether the atmosphere contains vapors or gases in sufficient quantities to be explosive. The explosimeter is calibrated by plumbing a small quantity of explosive gases into the instrument and comparing the instrument's output with the known gas concentration. This calibration is performed before each field use. The instrument is cleaned after each field assignment. All components are checked for proper working order and replaced as necessary.

4.7 CONDUCTIVITY METER

A YSI Model 33 S-C-T meter will be used to measure water conductivity. To calibrate, the meter is turned off and the level indicator is adjusted to zero on the readout face. Next, the meter switch is set to "RED LINE" and the level indicator is adjusted to the red line marking on the readout face.

4.8 pH METER

An L. G. Nester Model 47 mini pH meter will be used to measure water pH. The meter has a gel-filled combination electrode so that no reference refilling is required. To calibrate, the electrode is first immersed in a 6.86 pH buffer and the "CALIBRATE" knob is turned until the meter reads 6.86. The electrode is rinsed in distilled water and then immersed in a 4.01 pH buffer. Next, the "TEMP" knob is turned so that the meter reads 4.01, and the span is then adjusted. However, the meter should be calibrated to within 3 pH of the sample value. Therefore, for the 0 to 10 pH range, the meter should be set to read 8.86 and 6.01 versus 6.86 and 4.01 in the calibration procedure. For pH readings in the 4 to 14 range, the meter must be set to read 4.86 and 2.01 in the calibration procedure.

4.9 THERMOMETER (THERMOCOUPLE)

A Fluke Model 80TK will be used to measure the temperature of gases and liquids. This device has a range of -50° C to 1000° C to an accuracy of $\pm 1.0^{\circ}$ C. This instrument is calibrated by comparison with a Hewlett-Packard Model 2804A quartz thermometer standard. The calibration is performed by placing the standard's probe and the probe of the thermocouple in identical water baths. The output of the thermocouple is adjusted to correspond with the standard. The calibration is performed once a year but is more frequently checked with respect to other thermometers.

4.10 BAILERS

Teflon® bottom discharge bailers will be used for well sampling. The only calibration applicable for this type of equipment is an initial measurement of the length and internal diameter of the bailer to confirm the stated volume capacity. Prior to use, the threads will be inspected to ensure that connections are tight. The bailer will be inspected for scratches or dents that could also affect the integrity of the equipment. The operation of the discharge mechanism will be tested prior to use. The bailer will be packaged for transport to minimize the effects of jostling.

4.11 DECONTAMINATION SUPPLIES

All sampling equipment will be decontaminated prior to use and between samples to avoid cross-contamination. As specified in the Statement of Work, decontamination supplies will include hexane, laboratory-grade detergent, nitric acid, and distilled water. Certified grade hexane will be used to ensure high purity. Alconox laboratory-grade detergent (Fisher Scientific Company) will be used due to its low sudsing and low residue properties. The final rinsing of equipment will be

done using laboratory-grade distilled deionized water. All decontamination supplies will be transported sealed in unbreakable containers. The containers will be visually inspected for leaks or contamination prior to each use.

4.12 RESPIRATORS, CARTRIDGES, AND FILTERS

Half mask, combination filter/cartridge respirators will be donned by sampling personnel when field situations warrant. The respirators will be fitted with GMA cartridges with Type F filters for removal of organic vapors, dusts, and mists. These are NIOSH (National Institute for Occupational Safety and Health) tested, and NIOSH and MSHA (Mine Safety and Health Administration) approved. The GMA cartridge is approved for use in atmospheres containing at least 19.5 percent oxygen and less than 0.1 percent organic vapors by volume.

4.13 LOCKS

Good quality, reasonably priced padlocks will be placed on each monitor well to discourage tampering and vandalism. The locks will be purchased from a locksmith supplier and will be performance tested at the time of purchase and when placed on a well. The locks will be keyed alike to avoid the possibility of confusion among keys.

5.0 PREVENTIVE MAINTENANCE OF FIELD EQUIPMENT

All field equipment will be maintained according to manufacturers' specifications, as discussed below. As described in Section 4.0, all equipment will be assembled in the laboratory, if feasible, for calibration prior to mobilization. At this time, the equipment will be checked to ensure that it is in proper working order, and any required maintenance will be performed. Tools and equipment that may be needed for field maintenance will be assembled, and pertinent sections of the manuals will be photocopied for reference in the field.

LIST OF FIELD EQUIPMENT REQUIRING PREVENTIVE MAINTENANCE

- 5.1 Electromagnetics Terrain Conductivity Meter
- 5.2 Magnetometer
- 5.3 Metal Locator
- 5.4 Hand Pump
- 5.5 Total Organic Vapor Analyzer
- 5.6 Explosimeter
- 5.7 Conductivity Meter
- 5.8 pH Meter
- 5.9 Thermocouple
- 5.10 Bailers

5.1 ELECTROMAGNETICS TERRAIN CONDUCTIVITY METER

Field maintenance of the EM-31D and accessory logger consists of the following:

- o Battery replacement when low power is indicated; and
- o Inspection of the data logger interconnect cable and connector for visible evidence of damage.

Verification of stored data validity is obtained by periodic notation of instrument reading and data logger record number for comparison against the printout of the record values following a data dump.

5.2 MAGNETOMETER

Field maintenance of the OMNI-IV normally consists of the following tasks:

o Replacement of discharged battery pack with freshly charged battery pack when the battery descriptor indicates low power;

- o Inspection of sensor cable and battery pack cable (for belt pack) and connectors for visible evidence of damage; and
- o Checking the sensor bath fluid level for the presence of an adequate level of fluid as evidenced by a sloshing sound when the sensor is gently shaken.

5.3 METAL LOCATOR

Instrument field maintenance consists solely of battery replacement when the battery indicator meter shows low power.

5.4 HAND PUMP

The hand pump is packed and handled to minimize dents to the piping or damage to the pipe threads or check valve. When stored, the "O" rings should be kept in darkness to prevent deterioration so that a tight seal will be maintained when in use. When in use, it is important that the inner pump cylinder is not jammed down hard or pushed down into the sediment in the bottom of the well. This action has the potential to cause damage to the check valve, "O" ring seal assembly, and/or pump cylinder. A "holding dog" will be used to hold the pump assembly up in the well a safe distance (typically 2 feet) from the sediments at the bottom of the well.

5.5 TOTAL ORGANIC VAPOR ANALYZER

The detector must be kept clean for accurate operation. Foreign materials can be rinsed or wiped off or blown out of the detector. The cord between the analyzer and the recorder should not be wound tightly, and will be visually inspected for integrity before going into the field. A new cord will be ordered from the manufacturer if problems are found. A battery check indicator is included on the equipment and will be checked prior to going into the field and prior to use. The batteries will be charged if found to be weak. The analyzer, probe, and meter are packed securely and handled so as to minimize the chance of damaging parts.

5.6 EXPLOSIMETER

This instrument is cleaned after each field use and is calibrated before each field use. At the time of calibration, all components of the explosimeter are checked for proper working order and are replaced as necessary. Batteries are checked before going into the field and before use and are replaced as necessary. The explosimeter is packed and handled to prevent damage.

5.7 CONDUCTIVITY METER

The conductivity meter and detector are transported in a protective foam-lined case. The cell is tested before going into the field using the test feature and is repaired by the manufacturer as necessary. The contact between the detector and the recorder must be kept clean and can be wiped, rinsed, or blown out. The detector is cleaned with distilled water rinses after each use.

5.8 pH METER

The electrode probe should be kept clean and stored in a protective plastic boot. The probe and meter are packed in a foam-padded case for transport. Prior to use, the batteries are checked by sliding the "BATT CHK" switch to the right and noting whether the dial moves to the green "BATT CHK" area. Extra 9-volt batteries will be on hand in the event the batteries do not check.

5.9 THERMOCOUPLE

The thermocouple is checked annually for accuracy. If erroneous readings are shown during calibration, or suspected while in the field, the thermocouple will be either repaired or replaced. No other preventive maintenance is required except for care during handling.

5.10 BAILERS

The bailers will be visually inspected to ensure that connections are not stripped and that there are no holes or dents. The operation of the check valve will be tested before going into the field and cleaned, repaired, or replaced as necessary.

6.0 FIELD ANALYTICAL PROCEDURES AND DATA REPORTING

6.1 CHEMICAL DATA

Sections 10.3 and 10.4 describe field chemical analysis and sampling for off-site analysis, respectively. Field chemical data, including pH, temperature, conductivity, HNU, and LEL readings, will be tabulated for presentation in the investigation report. Results of chemical analysis by Dames & Moore's subcontractor, UBTL, will be presented as received from the subcontractor. A typical report will include the method used for analysis of each parameter, units, and detection limits. Water and soil quality control reports will accompany the analytical results and will include data on percent recovery on spiked samples (10 percent), duplicate sample analysis (10 percent), and trip and field blank analysis.

6.2 HYDRAULIC DATA

Hydraulic data regarding the glacial aquifer and bedrock aquifer will be obtained from the field program investigation and supplemented with information obtained from the literature review.

6.3 SOIL BORING DATA

Soil boring data will be collected in the field by an experienced Dames & Moore geologist or soils specialist, as described in Section 8.2. During boring operations, lithologic descriptions and stratigraphic logs will be developed. Special emphasis will be placed on field identification of contaminated soils that are encountered. The edited Dames & Moore logs (Figure 8-1) will be included in the appendix of the report, and the significance of soil conditions relative to contaminant migration will be discussed on a site-by-site basis. If a correlation exists between borings, scaled cross sections may be drafted to illustrate these correlations.

6.4 SURVEYING DATA

Surveying data will be presented in the appendix of the report as received from the Dames & Moore surveying subcontractor. The data will include elevations and locations of all wells installed during the field effort using benchmarks traceable to USCGS or USGS survey markers, if available. Elevations of significant bodies of standing water and elevations and locations of preexisting wells will also be included. The survey data, in conjunction with water level measurements (Section 10.1), will be used to construct contour maps of the ground water surface. Individual figures will be drafted for each site showing the locations of monitoring wells, borings, sampling points, known dumping locations, and inferred direction of ground water flow.

6.5 FIELD LOG

A daily field log will be maintained documenting weather conditions during field work and sampling.

7.0 SAMPLE NUMBERING SYSTEM

7.1 PROJECT IDENTIFICATION

The project shall be identified on sample labels as Duluth IAP with assigned Dames & Moore job number for the project.

7.2 SITE IDENTIFICATION

The sites shall be identified according to the following list, which is consistent with the Phase I identification except that the two fire training areas, FT-1 and FT-2, have been consolidated into one site.

- 1. D-1, Goose Site Dump
- 2. FT-1 and FT-2, Fire Training Areas
- 3. S-2, DPDO Storage Area "C"
- 4. SP-1, Tank Farm Area
- 5. D-4, South Goose Site Dump
- 6. D-2, Goose Site Dump
- 7. D-6, Runway 13 NE Disposal
- 8. S-1, Old DPDO Storage Area
- 9. D-9, Disposal Pit
- 10. RD-1, Low-Level Radioactive Waste Disposal

7.3 SEQUENCE NUMBER

Each sample shall be numbered sequentially as it is logged in the field in the master sample log.

7.4 SAMPLE DEPTH

Identification of soil samples shall include the depth interval (in feet from the ground surface) from which the sample was taken.

7.5 SAMPLE TYPE

The following abbreviations will be used to indicate sample type:

SW = Surface water

W = Ground water

SS = Surface sediment

B = Soil from boring

BW = Soil from well

7.6 EXAMPLES

Sample labels will contain the following information:

D&M Job Number
Location: Duluth IAP
Date
Time
Sampler's Initials
Sample Type
Sample Number

The sample number consists of four to five fields. Field 1 indicates the sample type, as given in Section 7.5. Field 2 indicates the site, as numbered in Section 7.2. Field 3 will be lettered consecutively starting with A for each set of samples of a given type at a given site. Field 4 gives the depth from which the sample was obtained. This field applies only to soil from borings and wells (sample types B and BW). Field 5 (Field 4 for sample types SW, W, and SS) is the sequence number (see Section 7.3).

Example 1: B 9-A, 0-1.5, 53

Field 1:	В	The sample type is a soil from a boring
Field 2:	9	The sample is from Site 9, D-9 Disposal Pit
Field 3:	Α	This sample is from the first soil boring drilled at Site 9
Field 4:	0-1.5'	The sample was obtained from a depth of 0 to 1.5 feet
Field 5:	53	This was the 53rd sample to be logged in the master sample log

Example 2: W 3-C, 63

Field 1:	W	The sample type is a ground water sample
Field 2:	3	The sample is from Site 3, S-2 DPDO Storage Area "C"
Field 3:	С	The sample was obtained from the third well drilled at Site 3
Field 4:	63	This was the 63rd sample to be logged in the master sample log

7.7 BLANKS, KNOWNS, SPIKES, SPLITS, AND DUPLICATES

Water sample field blanks, trip blanks, and duplicates will aggregate to an additional 15 percent of the sampling effort. Trip blanks will be prepared by UBTL, the laboratory subcontractor, using field sample collection containers and double distilled/deionized water. The trip blanks will accompany the sample bottles through the entire sampling history. This type of blank permits a determination of the laboratory's cleaning procedures of sample containers; these bottles will remain

sealed until opened for analysis. Field blanks will be prepared in the field with distilled water rinsed through the decontaminated bailer. This type of blank serves as a check on the field cleaning procedures.

Trip blanks and field blanks will be identified using the same numbering system as for standard samples to ensure that no preferential treatment is given to quality control samples. In general, quality control samples will be labeled as such only in the Dames & Moore master sample log, and will be identified by their sequence numbers.

Field duplicate water sampling will also be conducted for quality control purposes. Duplicate samples will be collected by sequentially filling two sample bottles with water from a single sample collection. All duplicate water samples will receive identical treatment, and will be identified using the same numbering system established for standard samples.

Laboratory spiked samples will be prepared and analyzed by UBTL for all chemical analyses performed. Laboratory duplicate analyses will also be performed. The laboratory spiked samples and laboratory duplicate samples will each comprise an additional 10 percent of individual sampling parameters. Results of laboratory spiked samples will be identified by UBTL and labeled with the standard sample numbering sequence, plus an additional identifier denoting that results reported are laboratory spike and duplicate analyses.

8.0 DRILLING AND INSTALLATION OF GROUND WATER MONITOR WELLS

8.1 DRILLING

The choice of drilling methods is influenced by two main factors: (1) the need to minimize the introduction of foreign material that may influence the results of chemical analyses; and (2) the need to penetrate diverse geologic materials.

All borings will be initiated using hollow-stem augers and will be extended by this method to auger refusal or to the required total depth. Data from a previous investigation at the site indicate that till containing abundant boulders may be present. If boulders are encountered, the hole may be moved a few feet and redrilled, or the boulder may be penetrated using diamond core drilling, at the discretion of the field technician. If boulders are encountered at a depth of less than 20 feet, the hole would typically be grouted to the surface and another attempt would be made a few feet away.

8.2 SOIL SAMPLING

Subsurface soil samples will be obtained at 5-foot intervals in borings that will be drilled for the installation of monitor wells. Subsurface soil samples will be obtained at 2½-foot intervals in soil borings. Samples will be obtained using a standard split spoon driven 18 inches using a standard 140-pound hammer.

Each soil sample will be logged in the field by a Dames & Moore geologist or soils specialist. The standard Dames & Moore field drilling log is shown in Figure 8-1. Information recorded on this form includes sample descriptions using the Unified Soil Classification System, boring location, drilling and sampling method, sampling interval, and hammer blows per 6-inch advance of the split spoon. All unusual characteristics, such as discoloration of soil, odor, or air monitoring results, will be noted in the field logs.

Split spoon decontamination and sample shipping are discussed in Sections 11.1 and 12.0, respectively.

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8.3 MONITOR WELL CONSTRUCTION AND COMPLETION

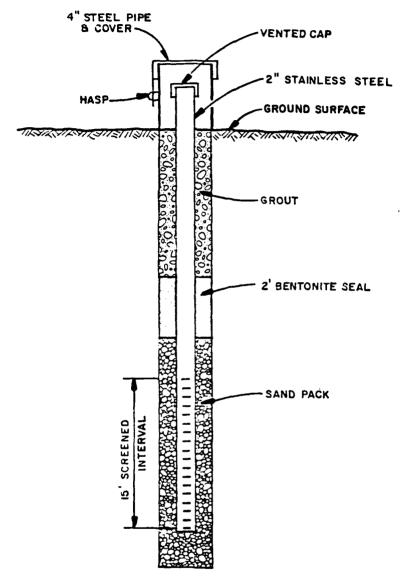
Monitor wells shall be constructed according to Minnesota Department of Health (MDH) and Minnesota Pollution Control Agency (MPCA) guidelines. Two-inch I.D. stainless steel will be used for casing and screen material. A screen slot size of 0.010 inch is considered most appropriate for this site because it is expected that a wide range of grain sizes will be encountered, and this screen size will prevent excessive silting while allowing proper well development. A sand pack will be placed around the well screen using tremie pipes, taking care to ensure that the pack is placed uniformly around the well. In most cases, the sand pack will extend from the bottom of the borehole to approximately 2 feet above the screened section. However, if a confining layer is encountered below the section to be screened, the hole through the confining layer will be grouted to prevent migration of contamination. A bentonite seal with a minimum thickness of 2 feet will be placed above the sand pack. The bentonite, either granulated, pelletized, or slurried, will be tremied in place to ensure a complete seal.

It is anticipated that an average screen length of 15 feet will be used. Actual screen length and depth of setting will depend upon conditions found in the field and will be determined with reference to the following considerations. The screened section should extend 10 feet into the aquifer of interest and 5 feet above the water table to allow for fluctuations in water table elevation. This may not be possible in locations where the depth to the water table is less than 3 to 5 feet because of the requirements for grouting the annulus to prevent seepage of surface water into the well. A neat cement grout containing less than 2 percent bentonite will be placed in the annulus around the well casing from a depth of 1 to 2 feet above the well screen to the surface.

A protective steel collar with locking cap shall be cemented in place over the stainless steel casing to prevent damage to the well. The wells will be seated in a 16- by 16- by 4-inch concrete surface pad. If the well is located in an area frequented by vehicular traffic, three steel posts will be placed around the well. Each well will be permanently labeled with its assigned number. Typical well construction is illustrated in Figure 8-2.

8.4 WELL DEVELOPMENT

All wells will be developed after completion to insure that relatively sediment-free water samples can be obtained. The method of development will depend upon the equipment available, but methods involving a foreign source of water will not be used. Air-lift pumping or mechanical surging with a bailer may be used.



(NOT TO SCALE)

FIGURE 8-2
TYPICAL MONITORING WELL INSTALLATION

Dames & Moore

8.5 GEOPHYSICAL LOGGING

Geophysical logging of borings will not be performed at Duluth IAP because the heterogeneous nature of the geologic material present at the site will make the logs difficult to interpret and because the close spacing of split spoon samples will provide adequate information.

9.0 PUMP TEST

Pump tests, per se, will not be conducted during this investigation.

10.0 GROUND WATER MONITORING AND SAMPLING

10.1 GROUND WATER LEVEL MEASUREMENT

The depth to ground water will be measured in each well from the top of the stainless steel casing. This measurement will be made to the closest 0.01 foot using a ploper device or an electronic water level indicator. The distance from the top of the stainless steel casing to the ground surface will be recorded to the nearest 0.1 foot.

Water levels will be measured once each day on 3 consecutive days of the field effort in each well. These triplicate measurements will be useful for confirming that the wells have stabilized, or for recognizing the magnitude of short-term ground water fluctuations.

10.2 SURVEYING OF WELLS

In order to establish ground water flow patterns, a survey will be made of all newly installed monitor wells and of key surface water elevations. The elevations of the top of the stainless steel casing will be measured to an accuracy of 0.01 foot, and horizontal locations will be accurate to 1 foot. The survey will be tied to a reference datum point (base benchmark) and will be traceable to a USCGS/USGS survey marker.

10.3 ON-SITE ANALYSIS

Before water samples are collected for shipment to the laboratory, and after the wells have stabilized, a separate water sample from each well and surface water sampling location will be analyzed in the field for pH, conductivity, temperature, and color. Meters will be calibrated and maintained as described in Sections 4.0 and 5.0. The pH meter will be calibrated before each set of measurements using standard buffer solutions. Calibration of the thermometer and the conductivity meter will be checked in the laboratory before commencement of the field effort. All instrument probes will be rinsed with distilled water between measurements. The sample will be placed in a clean container against a white background when determining color. Since temperature can affect conductivity and pH readings, all measurements will be taken consecutively on the same sample. Precautions will be taken to obtain a representative sample as described in Section 10.4.

Soil samples will be monitored in the field for organic vapors using an HNU photoionization meter or an organic vapor analyzer (OVA). The readings will be taken immediately after opening the split spoon and will be recorded directly on the boring logs. The boreholes will be monitored with both the HNU and the explosimeter during drilling.

10.4 SAMPLING FOR OFF-SITE ANALYSIS

Ground water samples will be obtained from monitor wells after proper well development (Section 8.4) using a Teflon bailer. Prior to sample collection, a stabilization test will be performed on each well to ensure that standing water in the well casing has been removed and that the sample will be representative of the aquifer. To perform the test, the well will be air-lift pumped or bailed while monitoring the pH, temperature, and specific conductance of the discharge. When three successive readings (taken at intervals of one well volume) give equivalent values, the well is considered to have stabilized. Values are considered stabilized by the MPCA if they fall within the following ranges:

Specific conductance (temperature corrected): ± 10 μmhos/cm pH: ± 0.1 pH unit
Temperature: ± 0.5°C

A form to be filled out during the stabilization test is given in Figure 10-1. The sample will be transferred directly from the bailer to the sample container supplied by the laboratory. Turbulence will be minimized during the transfer operation to prevent the loss of volatile organics. Containers will be filled to capacity to minimize the loss of volatile constituents to the head space.

Surface water samples will be obtained by grab sampling. Since the shipping containers provided by the laboratory will contain preservatives, a separate sampling container will be used to collect the sample and prevent the loss of the preservative. The sampling device will be decontaminated between samples, as described in Section 11.4, and will be rinsed with the water to be sampled immediately before sampling.

Subsurface soil samples will be obtained using standard split spoon methods, as described in Section 8.2. After the sample has been logged, a stainless steel spoon will be used to transfer the sample to a glass sample jar with a Teflon-lined cap. As much of the sample as possible will be placed in the jar, but if the jar does not have the capacity, the greatest concentration of contamination, as indicated by visual examination or HNU readings, will be selectively collected.

Surface soil samples will be collected in a similar manner, using a stainless steel sampling spoon or spade.

Sediment samples from the ponds near the Goose site dumps will be collected using a drop corer device or an Ekman dredge. The sampler will be operated from a boat or through holes cored in the ice, depending on site conditions at the time of the field effort.

FIGURE 10-1
STABILIZATION TEST

	WELL VOLUME EXTRACTED											
PARAMETER	1	2	3	4	5	6	7	8	9	10		
Specific conductance (temperature corrected) + 10 µmhos/cm								-				
pH: <u>+</u> 0.1 pH unit					-							
Temperature: ± 0.5°C												
Color												
Odor of Discharge												

11.0 DECONTAMINATION PROCEDURES

11.1 DRILLING, SOIL SAMPLING, AND MONITOR WELL INSTALLATION

Precautions will be taken not to introduce contaminants into the well during drilling and well installation. The rear end of the drill rig, augers, and rods will be steam cleaned between holes except in the case where the hole is moved only a short distance because of refusal on boulders.

Split spoon samplers will be decontaminated after each sample according to the following procedure:

- 1. Wash with laboratory-grade detergent; and
- 2. Rinse three times with distilled water, the final rinse with reagent-grade water.

Where field conditions warrant more extensive decontamination procedures, the following will be employed:

- 1. Wash with detergent, rinse with distilled water;
- 2. Wash with hexane, rinse with distilled water; and
- 3. Wash with dilute nitric acid, rinse three times with distilled water, the final rinse with reagent-grade water.

11.2 WELL DEVELOPMENT

Wells will be developed by bailing or by air-lift or hand pumping, as described in Section 8.4. Any part of the air-lift equipment, hand pump, or Teflon bailer that is placed down the hole will be decontaminated after developing each well using the following procedure:

- 1. Wash with laboratory-grade detergent, rinse with distilled water; and
- 2. Rinse three times with distilled water, the final rinse with reagent-grade water.

Where field conditions warrant, the more extensive decontamination procedure outlined above will be followed.

11.3 WATER LEVEL MEASUREMENT

The probe used for water level measurements will be decontaminated between wells by rinsing with distilled water. Full decontamination procedures, described in Section 11.1, will be used if the probe or line becomes exposed to observed high concentrations of contaminants.

11.4 WATER SAMPLING

Water samples will be obtained by bailing using a Teflon bailer on a dedicated monofilament line, as described in Section 10.4. The bailer will be decontaminated between wells as described above.

11.5 SEDIMENT SAMPLING

Sediment sampling devices, including stainless steel spoons, shovels, and drop samplers, shall be decontaminated after collection of each sample using the same procedures as for split spoon samplers, described in Section 11.1.

11.6 PERSONNEL DECONTAMINATION

A personnel decontamination station shall be established at a location approved by base personnel. Persons working on the site shall report to the station for decontamination before leaving the base. In most instances, removal of protective clothing will suffice for decontamination. The station will have facilities for storage of reusable protective clothing and for the disposal of clothing contaminated beyond reuse. Also, facilities for decontaminating hands, boots, and gloves, consisting of detergent wash and tap water rinse, shall be provided. Facilities for sanitizing respirators using manufacturers' instructions shall be provided.

11.7 SAMPLE HANDLING

Samples will be handled by personnel wearing nitrile gloves to avoid contamination. The sample containers will be well cushioned with packing materials when they are placed in the insulated cooling chests for transportation to the laboratories. Care will be taken to seal bottle/vial caps tightly. Extra insurance against opening in transit will be provided by sealing the caps with filament tape for medium concentration samples.

12.0 SAMPLE HANDLING AND PACKAGING

12.1 SPLIT SAMPLE PROCEDURES

In order for split sample analysis to be valid, the split sample must be as homogeneous as possible. Split spoon samples should be split vertically so that vertical stratification of contaminants will be equally distributed between the samples.

Split ground water samples will be collected at the same time using the same bailer. MPCA personnel may participate in split sample acquisition. Half the bailer volume will be poured into each jar until the jars are full. Sample containers, preservatives, and handling will be identical for each member of the split sample.

12.2 SAMPLE CONTAINERS

Sample containers will be provided by UBTL. The containers will be either plastic or glass with Teflon-lined lids and will be pretreated with the preservatives listed in Table 12-1 (taken from Sabel and Clark, 1985).

12.3 SAMPLE HANDLING AND DECONTAMINATION

After collection in the field, all samples will be brought to an area adjacent to the personnel decontamination area for decontamination of sample containers. The sample containers will be handled with gloves until decontaminated with a detergent wash and tap water rinse if spills have occurred on the outside of the container. Care must be taken to avoid damaging the label during decontamination. The samples will be stored on ice and will be shipped to the laboratory at the end of each day's sampling via overnight delivery.

12.4 PROCEDURES FOR PACKING LOW CONCENTRATION SAMPLES

Packing procedures will follow recommendations given in the USEPA manual, "Field Monitoring and Sampling of Hazardous Materials," Section 2, Part 5 (January 1983), as described for environmental samples, which are those samples obtained from upgradient and downgradient of the site (not at the actual site) and do not have any indications of gross contamination. These samples will be packaged as follows:

o Place the labeled and sealed sample container in a polyethylene bag and seal the bag;

TABLE 12-1
SAMPLE HANDLING PROCEDURES

Parameter	Container ^a	Preservative ^{b,c}	Maximum Holding Time ^d
Metalse			
(except Cr+6 and Hg)	P, G	HNO_3 to $pH < 2$	6 months
Mercury	P, G	HNO ₃ to pH < 2	28 days
Petroleum Hydrocarbons	G	Cool, 4°C; H ₂ SO ₄ to pH < 2	28 days
Organic Testsf			
Purgeable halocarbons	G, Teflon- lined septum	Cool, 4°C; 0.008% Na ₂ S ₂ O ₃ g	14 days
Purgeable aromatics	G, Teflon- lined septum	Cool, 4°C; 0.008% Na ₂ S ₂ O ₃ 8; HCl to pH < 2 ^h	14 days
Acrolein and acrylonitrile	G, Teflon- lined septum	Cool, 4°C; 0.008% Na ₂ S ₂ O ₃ 8; adjust pH to 4-5 ¹	l4 days
Phenols	G, Teflon- lined septum	Cool, 4°C; 0.008% Na ₂ S ₂ O ₃ g	7 days until extraction, 40 days after extraction
Benzidines	G, Teflon- lined septum	Cool, 4°C; 0.008% Na ₂ S ₂ O ₃ g	7 days until extraction, 40 days after extraction
Phthalate esters	G, Teflon- lined cap	Cool, 4°C	7 days until extraction, 40 days after extraction
Nitrosamines	G, Teflon- lined cap	Cool, 4°C; store in dark; 0.008% Na ₂ S ₂ O ₃ g	7 days until extraction, 40 days after extraction

TABLE 12-1 (continued)

Parameter	Container ^a	Preservative ^{b,c}	Maximum Holding Time ^d
PCBs	G, Teflon- lined cap	Cool, 4°C; pH 5-9	7 days until extraction, 40 days after extraction
Nitroaromatics and isophorone	G, Teflon- lined cap	Cool, 4°C	7 days until extraction, 40 days after extraction
Polynuclear aromatic hydrocarbons	G, Teflon- lined cap	Cool, 4°C; 0.008% Na ₂ S ₂ O ₃ B; store in dark	7 days until extraction, 40 days after extraction
Haloethers	G, Teflon- lined cap	Cool, 4°C; 0.008% Na ₂ S ₂ O ₃ g	7 days until extraction, 40 days after extraction
Chlorinated hydro- carbons	G, Teflon- lined cap	Cool, 4°C	7 days until extraction, 40 days after extraction
TCDD	G, Teflon- lined cap	Cool, 4°C; 0.008% Na ₂ S ₂ O ₃ g	7 days until extraction, 40 days after extraction
Pesticides Test			
Pesticides	G, Teflon- lined septum	Cool, 4°C; pH 5-9 ^k	7 days until extraction, 40 days after extraction
Radiological Tests			
Alpha, beta and radium	P, G	HNO ₃ to pH < 2	6 months

TABLE 12-1 (continued)

aPolyethylene (P) or glass (G).

bSample preservation should be performed immediately upon sample collection. For composite samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.

CWhen any sample is to be shipped by common carrier or sent through the United States Mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirements of this section, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: hydrochloric acid (HCI) in water solutions at concentrations of 0.04% or less by weight (pH about 1.96 or greater); nitric acid (HNO3) in water solutions at concentrations of 0.15% or less by weight (pH about 1.62 or greater); sulfuric acid (H₂SO₄) in water solutions at concentrations of 0.35% or less by weight (pH about 1.15 or greater); and sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% or less by weight (pH about 12.30 or less).

dSamples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that the specific types of samples under study are stable for the longer time. Some samples may not be stable for the maximum time period given in the table. A permittee, or monitoring laboratory, is obligated to hold the sample for a shorter time if knowledge exists to show this is necessary to maintain sample stability.

eSamples should be filtered immediately on site before adding preservatives for dissolved metals.

fGuidance applies to samples to be analyzed by GC, LC, or GC/MS for specific compounds.

8Should only be used in the presence of residual chlorine.

hSample receiving no pH adjustment must be analyzed within 7 days of sampling.

Samples for acrolein receiving no pH adjustment must be analyzed within 3 days of sampling.

JFor the analysis of diphenylnitrosamine, add 0.008% Na₂S₂O₃ and adjust pH to 7-10 with NaOH within 24 hours of sampling.

kThe pH adjustment may be performed upon receipt at the laboratory and may be omitted if the samples are extracted within 72 hours of collection. For the analysis of aldrin, add 0.008% Na₂S₂O₃.

Reference: Sabel and Clark, 1985.

- o Place the sample in a metal or plastic picnic cooler containing a waterproof container of ice or an ice substitute and dividers to κeep sample jars separated to minimize the possibility of breakage; and
- o Seal the cooler with the latch and with packaging tape.

12.5 PROCEDURES FOR PACKING MEDIUM CONCENTRATION SAMPLES

Medium concentration samples will be packed in the same manner as described in Section 12.4 for low concentration samples. However, an effort will be made to identify, by visual examination in the field, any samples suspected of having elevated contaminant concentrations. These samples will be segregated and packed in a separate container, to the extent allowed by prevailing field conditions. Containers for these samples will be sealed with tape in addition to the normal processing used on all samples collected.

13.0 SAMPLE CUSTODY AND DOCUMENTATION

13.1 SAMPLE IDENTIFICATION DOCUMENTS

Each sample shall be identified using the sample numbering system described in Section 7.0. A label on each sample container will contain the following information:

- o Dames & Moore Job Number
- o Location of Collection
- o Time of Collection
- o Date of Collection
- o Sample Type
- o Sampler's Initials
- o Purpose of Sample
- o Preservatives Used

At the end of each day's sampling effort, and before the samples are shipped to the analytical laboratory, this information will be recorded in the master sample log. Each sample will be assigned a unique sequence number, to be recorded both in the log and on the label, that will be used to identify the samples and to correlate with laboratory sample numbers assigned by UBTL.

13.2 CHAIN-OF CUSTODY RECORDS

A sample chain-of-custody form to be used during this investigation is illustrated in Figure 13-1. Chain-of-custody procedures will be followed so that the possession of a sample can be traced from the time of collection until the data are used in legal proceedings. One or more chain-of-custody forms will accompany each set of samples shipped from the site. Each time the custody of the samples is transferred, the form is signed by both the person relinquishing and the person receiving the samples. A copy of the form will be retained by the sampler, who will fill in the information on sample identity and who will also be the first person to relinquish the sample. If the sample containers appear to have been opened or tampered with, this should be noted by the person receiving the samples under the section entitled "Remarks."

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

D Field Personnel (Signature)		Remarks												1 by: Date Time	l by: Date Time	by: Date Time
ID Field Person														Received by:	Received by (Signature)	ne Received by: (Signature)
ZECON		Ф												Date Time	Date Time	Date Time
& MOORE CHAIN-OF-CUSTODY RECORD	Job No.	Sampling Site												Relinquished by: (Signature)	Relinquished by: (Signature)	Relinquished by: Da (Signature)
TAIN		of iners												ТІшс	Time	Time
분 기		No. of Containers												Date	Date	Date
DAMES & MOO		Sample Type												Received by: (Signature)	Received by: (Signature)	Kecelved by: (Signature)
		ple No.												Tine	Tine	Tine
& Client		Sample I.D. No.												Date	Date	Da t e
Sample Source &	Project Title	Date Time							D	SUF ES	13- MO	E		Relinquished by: (Signature)	Relinquished by: (Signature)	Relinquished by: (Signature)
Sa	à	DAMES & MOORE CHAIN-OF-CUSTODY RECORD E S S S S S S S S S S S S S S S S S S														

13.3 FIELD LOG BOOKS

Each Dames & Moore professional shall maintain a personal field log book while on the site. Information recorded in the log book shall be written in an objective, factual manner so that persons reading the entries will be able to determine the sequence of events as they occurred in the field. If notes are made in the log book by someone other than the owner of the book, this should be indicated by the writer's signature and date. Information to be recorded in the field log book will include:

- o Date and time of entry;
- o Sample number;
- o Sample description;
- o Method of sampling;
- o Location of sampling;
- Sketch of sample location;
- o Field measurements such as pH, conductivity, HNU, and temperature;
- o Names and phone numbers of field contacts, drillers, and persons on site;
- Materials used in well construction;
- o Driller's standby and drilling time; and
- Weather and field conditions during drilling and sampling.

In addition to the above information, the following forms will be used to record detailed data:

- o Dames & Moore Boring Log (Figure 8-1) used in the field to record detailed sample descriptions and drilling methods;
- o Field Memorandum (Figure 13-2) used to outline daily activities for information of project manager and file records; and
- o Monitor Well Detail Information Sheet (Figure 13-3) used to record details of well installation.

Other forms are described in appropriate sections of this plan.

13.4 CORRECTIONS TO DOCUMENTATION

Any errors or mistakes in original field data shall be crossed out with a single line, and the person making the correction shall initial it. No data shall be erased.

ACTION	INFO	
To:	L	File:
		- V.D./
	 	X-Ref:
· · · · · · · · · · · · · · · · · · ·		
		Date:
From:		Reply Required By:
rrom:		neply nequired by:
Subject:		

Reference(s):

FIGURE 13-2 DAMES & MOORE FIELD MEMORANDUM ROUTING

[86]

114,8 (REV. 5-68)

M-94

Inmac & Moore

CROUND CUREAGE CARACTER	JOB NUMBER
TOP OF WELL CASING ELEVATION	
-	DATE
	LOCATION
	DEPTH TO BOTTOM OF WELL FOINT OR SLOTTED PIPE FEET. *
	DEPTH TO BOTTOM OF SEAL (IF INSTALLED) FEET. *
	<pre> J DEPTH TO TOP OF SEAL (IF INSTALLED) FEET.* J DEPTH TO TOP OF SEAL (IF INSTALLED) FEET.* J DEPTH TO TOP OF SEAL (IF INSTALLED) J D D D D D D D D D D D D D D D D D D</pre>
	LENGTH OF WELL SCREENFEET.
	5 TOTAL LENGTH OF PIPE FEET AT INCH DIAMETER.
5	6 TYPE OF PACK AROUND WELL POINT OR SLOTTED
	(CIRCLE CHE)
	HEIGHT OF WELL CASING ABOVE GROUND FEET.
(3)	PROTECTIVE CASING? YES NO (CIRCLE CHE) HEIGHT ABOVE GROUND FEET. LOCKING CAP? YES NO (CIRCLE ONE)
2	TYPE OF UPPER SACKFILL
	BOREHOLE DIAMETERINCHES.
	12 DEPTH TO GROUND WATERFEET. *
(16)	13 TOTAL DEPTH OF BOREHOLE FEET.*
★ 登 事際	14) TYPE OF LOWER BACKFILL.
(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	15) PIPE MATERIAL
(14)	16 SCREEN MATERIAL
	*(DEPTH FROM GROUND SURFACE)
13	
into zini zini	FIGURE 13-3
	PIEZOMETER INSTALLATION DETAILS
	[87] Dames & Moore
	Dames & Moore

In some circumstances, original documents may be transcribed, making appropriate changes and eliminating errors. In these cases, the successive documents shall be dated and numbered as sequential drafts.

13.5 TRAFFIC REPORTS

Knowledge of sample status will be maintained through review and evaluation of Dames & Moore field engineer reports, discussions with field personnel, and through contact with UBTL on a periodic basis. In this way, a working knowledge of sample traffic will be available through the project.

13.6 SHIPPING OF SAMPLES

Samples will be shipped at the end of each day's sampling efforts via overnight delivery to UBTL and OEHL. Sample packing procedures are given in Section 12.4.

14.0 SITE CLEANUP

A certain amount of trash will be generated from site investigation activities, including protective clothing, gloves, and cement bags. This material, assuming it has not been contaminated, will be disposed of in the proper locations (dumpsters, rubbish disposal areas) on site. Each site will be policed after completion of activities to ensure that no trash remains.

Soil wastes will be generated from drilling activities, but because drilling will not be conducted directly in the areas of dumping, it is expected that the soil will have only very low concentrations of contaminants. The soil from each hole will be monitored with the HNU and explosimeter. Any soil showing an organic vapor reading of less than 50 ppm and an LEL reading of less than 25 percent and having no unusual colors or odors will be considered uncontaminated and will be disposed of by spreading on site. Samples exceeding these criteria will be sealed in new 55-gallon drums. The same criteria will be used to determine if protective clothing has been contaminated. Any such contaminated clothing will be drummed along with the soil. The drums will become the temporary property of the base.

The suspected contaminated waste will be tested for EP Toxicity and ignitability. Dames & Moore shall be responsible for transporting drums containing suspected contaminated soils. Dames & Moore shall be responsible for the ultimate disposal of contaminated soils in accordance with current federal, state, and/or local hazardous waste disposal laws. Dames & Moore shall provide a final, completed copy of the hazardous waste manifest document to the HQ TAC/SGPB point of contact referenced in paragraph V for those borehole cuttings obtained from TAC sites (Sites 1, 5, 6, 7, and 9) and to the ANGSC/SGB point of contact referenced in paragraph V for those borehole cuttings obtained from ANG sites (Sites 2, 3, 4, 8, and 10).

15.0 FIELD TEAM ORGANIZATION AND RESPONSIBILITIES

15.1 ORGANIZATION

The Dames & Moore project organization for the Phase II, Stage 2 investigation at Duluth IAP will be as follows:

- o Project Director: Mr. Glenn D. Martin, Managing Principal-in-Charge
- o Principal Investigator: Mr. Michael W. Ander, Associate
- o Project Manager: Ms. Carol J. Scholl, Staff Geologist
- o Principal Staff Assistant: Ms. Beverly J. Harper, Environmental Scientist
- o Field Manager: Ms. Amy D. Lamborg, Assistant Geologist
- o Geophysicist: Mr. Thomas E. Jensen, Senior Geophysicist

A number of additional Dames & Moore staff level personnel will assist in field operations, data interpretation and report preparation as necessary.

15.2 RESPONSIBILITIES

Responsibilities for the individuals identified in Section 15.1 will be as follows:

- o Project Director -- Responsible for overall project direction and surveillance.
- o Principal Investigator -- The primary point of contact with OEHL and other Dames & Moore personnel, and the principal senior investigator responsible for project technical activities.
- o Project Manager Assistant to Principal Investigator in project management and a secondary point of contact with OEHL. Responsible for technical oversight of all project chemistry activities during data collection and analysis.
- o Principal Staff Assistant Assistant to Principal Investigator and Project Manager in project management, coordination, and operation.
- o Field Manager Responsible for organization and direction of field investigations. Will mobilize "the field" team, to include Dames & Moore assistant professionals or technicians and drilling and surveying subcontractors. Will stake locations of all sampling points and boring locations in consultation with the OEHL manager and the Project Director,

review the site safety plan with site personnel, and monitor the initial drilling activities. In addition, will be responsible for proper recording and transmittal of field records, and shipment of samples to UBTL for analysis.

o Geophysicist — Will conduct all site geophysical surveys and be responsible for all geophysical data interpretation and analysis.

15.3 TRAINING

15.3.1 Dames & Moore Personnel

The Dames & Moore personnel of staff level and above to be utilized on this job all have professional degrees in relevant fields, and previous experience in similar types of investigations. All field personnel will be thoroughly briefed on the appropriate safety measures specific to work on this project, and will have received safety training in accordance with Dames & Moore's firmwide Health and Safety Program.

15.3.2 Subcontractors

All site subcontractors will be thoroughly briefed on the following key aspects of project work:

- o Project scope of work pertaining to the subcontractor's anticipated role;
- o Site Health and Safety Considerations; and
- o Timetable, cost, and other limitations pertinent to successful completion of the project within contractual scope.

Subcontractors selected will be experienced in related types of investigation, and have a demonstrated technical ability to complete their designated tasks.

16.0 SCHEDULE

Dames & Moore would be in a position to commence field work on this project within 4 weeks of receipt of the Work Order for Phase II, Stage 2. Figure 16-1 presents the milestone chart of the proposed schedule. The schedule assumes that drilling will commence immediately upon completion of the geophysical investigation. The project duration from time of receipt of the Work Order to submittal of the draft report is estimated to be 18 weeks (i.e., submittal of the first draft to USAFOEHL the week of January 26, 1987). It is anticipated that subsequent drafts will be submitted 4 weeks after receipt of review comments.

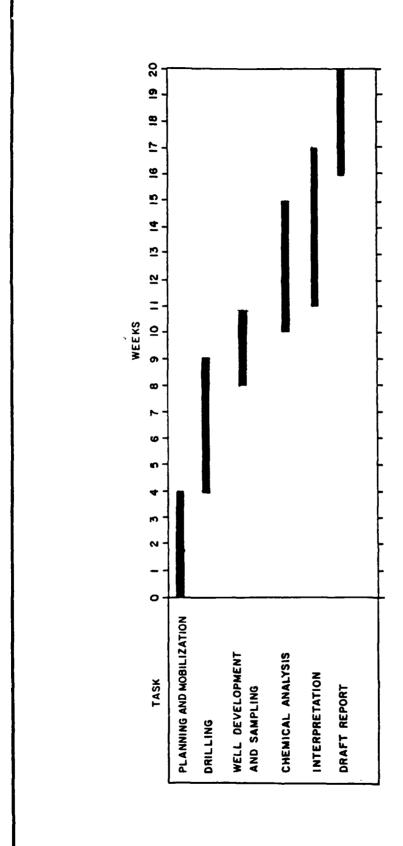


FIGURE 16-1 PROPOSED SCHEDULE FOR PHASE II STAGE 2 INVESTIGATION AT DULUTH IAP, MINNESOTA

17.0 REFERENCES

- Adolphson, D.G., Ruhl, J.F., and Wolf, R.J., 1981, Designation of principal water supply aquifers in Minnesota. Water Resources Investigation 81-51, U.S. Geological Survey and U.S. Environmental Protection Agency,
- Anderson, H.W., Jr., 1986, Hydrogeologic and water quality characteristics of crystalline rock aquifers of Archean and Proterozoic age, Minnesota. Water Resources Investigations Report 86-4033, U.S. Geological Survey, St. Paul, Minnesota.
- Bonnichson, W., 1971, Outcrop map of southern part of Duluth complex and associated Keweenawan rocks, St. Louis and Lake Counties, Minnesota. Miscellaneous Map Series, Map M-11, University of Minnesota, St. Paul.
- Carlson, M.O., MSgt., MANG, Duluth IAP, Minnesota, 1985, Personal communications (May 23 and June 25).
- Engineering-Science, 1982, Installation Restoration Program, Phase I Records Search, Duluth International Airport, Minnesota (USAF Contract No. F08637-80-G0009, Call No. 0012). Engineering-Science, Atlanta, Georgia (March).
- Gunard, K.T., Hess, J.H., Zirbel, J.L., and Cornelius, C.E., 1983, Water resources data, Minnesota, Volume 1: Great Lakes and Souris-Red-Rainy river basins. USGS Water Data Report No. MN-83-1, U.S. Geological Survey, Minnesota Department of Natural Resources, Division of Waters, Minnesota Department of Transportation, and other state, municipal, and federal agencies.
- Hill, S., K. I. Sawyer AFB, Michigan, 1985, Personal communication (May 23).
- Hobbs, H.C., and Goebel, J.E., 1982, Geologic map of Minnesota Quaternary geology. Minnesota Geologic Survey, State Map Series S-1, University of Minnesota, scale 1:500,000.
- Kanivetsky, R., undated, An appraisal of ground water resources for the new Natural Resources Research Institute in Duluth, Minnesota. University of Minnesota, Physical Planning Office.
- ______, 1978, Hydrogeologic map of Minnesota bedrock hydrogeology. Map S-2, University of Minnesota, St. Paul.
- _____, 1979, Hydrogeologic map of Minnesota quaternary hydrogeology. Map S-3, University of Minnesota, St. Paul.

- Lindholm, G.F., Ericson, D.W., Brounard, W.L., and Hult, M.F., 1979, Water resources of the St. Louis River watershed, northeastern Minnesota. Hydrologic Investigations Atlas HA-586, U.S. Geological Survey and Minnesota Department of Natural Resources, Division of Waters.
- Little, C., HQ TAC, Langley AFB, Virginia, 1985, Personal communication (May 21).
- Manns, J.D., Maj., MANG, Duluth IAP, Minnesota, 1985, Personal communication (May 24).
- Minnesota Department of Health, 1984, Water well construction code 4725.0100.
- Minnesota Pollution Control Agency, 1985, Letter to Capt. D. Bradford, USAF, Director, Environmental Planning Division, AFESC, signed by T. J. Kalitowski, Executive Director (January 30).
- Moghissi, A.A., et al., 1978, Radioactivity in consumer products. NUREG/CP-0001.
- Public Health Service, U.S. Department of Health, Education and Welfare, 1970, Radiological health handbook. HEW/PHS, Rockville, Maryland.
- Rogers, J.E., 1962, Reconnaissance of ground water conditions in the Duluth Municipal Airport area, Minnesota. U.S. Geological Survey, St. Paul, Minnesota.
- Roy F. Weston, Inc., 1984, Installation Restoration Program, Final Report, Phase II Stage 1, Problem Confirmation Study, Duluth International Airport, Duluth, Minnesota (USAF Contract No. F33615-80-D-4006, Task Order 0025). Roy F. Weston, Inc., West Chester, Pennsylvania (October).
- Schwartz, G.M., 1949, The geology of the Duluth metropolitan area. Bulletin 33, University of Minnesota and Minnesota Geological Survey.
- Siegel, D.I., and Ericson, D.W., undated, Hydrology and water quality of the copper-nickel study region, northeastern Minnesota. Water Resources Investigations 80-739, U.S. Geological Survey, Minnesota Environmental Quality Board, and Copper-Nickel Study Staff.
- Sims, P.K., and Morey, G.B., 1972, Geology of Minnesota: a centennial volume. Minnesota Geological Survey.
- Taylor, R.R., 1963, Geologic map of Duluth and vicinity, St. Louis County, Minnesota, bedrock geology. University of Minnesota Press, Minneapolis.
- , 1964, Bedrock geology of Duluth and vicinity, St. Louis County, Minnesota. Geologic Map Series GM-1, University of Minnesota and Minnesota Geological Survey, Minneapolis.
- Bulletin 44, University of Minnesota and Minnesota Geological Survey, Minneapolis.

- Thiel, G.A., 1947, The geology and underground waters of northeastern Minnesota. Bulletin 32, University of Minnesota and Minnesota Geological Survey, Minneapolis.
- Thornbury, W.D., 1965, Regional geomorphology of the United States. John Wiley & Sons, Inc., New York, p. 607.
- U.S. Department of the Interior, Geological Survey, 1975, Duluth Heights quadrangle, Minnesota, St. Louis County. AMS 7577 1 SW Series V872.
- U.S. Environmental Protection Agency, 1985, Letter to Capt. D. Bradford, USAF, Director, Environmental Planning Division, AFESC, signed by J. Plucinski, Remedial Project Manager, Region V (February 6).

APPENDIX A
HEALTH AND SAFETY PLAN
(SEE SECTION 3.2)

APPENDIX B
STATEMENT OF WORK

Installation Restoration Program Phase II - Stage 2 Duluth International Airport Minnesota

30 JUL 1965

DAMES & MOORE

AUG 04 1986

I. DESCRIPTION OF WORK

PARK RIDGE III

The objective of IRP Phase II investigations is to identify contaminants and then define the magnitude, extent, direction and rate of movement of identified contaminants. A series of staged field studies may be required to meet this objective.

The Phase II Stage 2 effort at Duluth IAP will entail a follow-on investigation for five sites evaluated during Phase II, Stage 1, and an initial monitoring program at six additional sites. The sites which are included in this study are identified in Table 1 and can be located on an installation map, Figure 1. The sites to receive follow-on investigative work are Goose Dump 1, Fire Training Areas, DPDO Storage Area "C" and the Tank Farm Area.

The purpose of this effort at Duluth IAP is to: (1) confirm the presence or absence of contamination within the specifed areas of investigation; (2) if contamination exists, determine the magnitude of contamination, and the potential for and rate of migration of those contaminants in the various environmental media; (3) identify potential environmental and health risk consequences of migrating pollutants; and (4) recommend additional investigations necessary to further define the magnitude, extent, direction and rate of contaminant migration.

The Phase I and the Phase II Stage 1 IRP Reports (mailed under separate cover) incorporate the background and description of the sites included in this task. To accomplish this survey effort, take the following actions:

A. General

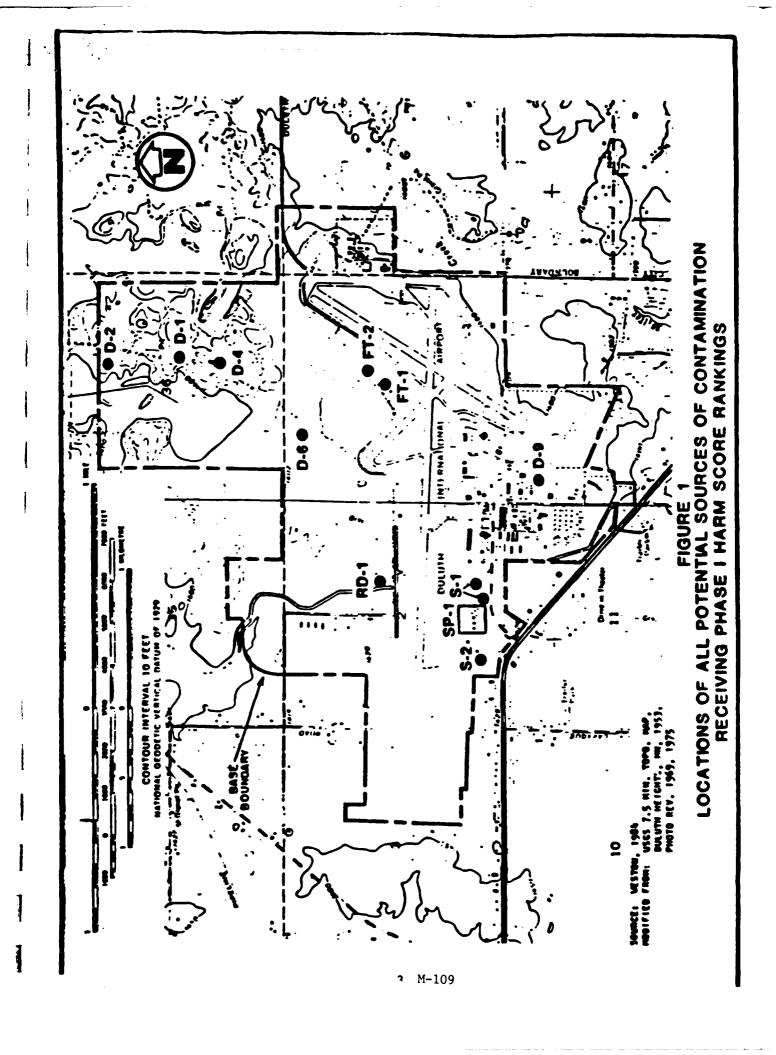
- l. Monitor all borehole and well drilling with a photoionization meter or equivalent organic vapor detector to identify the potential generation of hazardous and/or toxic vapors or gases. Include air monitoring results in the boring logs. If soil encountered during drilling or test pit work is suspected to be hazardous because of discoloration, odor or air monitoring, containerize the soil cuttings in new, unused drums. Enter into the boring logs the depth(s) from which suspected contaminated soil cuttings were collected. Test each drum containing suspected contaminated soils by taking a composite sample. Collect a maximum of 15 composite samples and test them for EP Toxicity and Ignitibility. (Ref: 40 CFR Subpart C., 261.21 Ignitibility and 261.24 EP Toxicity).
- 2. Determine the exact field location of all boreholes and monitor wells during the planning/mobilization phase of the field investigation. Consult with base personnel to minimize disruption of base activities, to properly position boreholes with respect to exact locations of spill/leak sites, and to avoid underground utilities. The senior on-site contract representative, in consultation with the USAF OEHL project manager and the base point-of-contact (see Section V), establishes the final borehole and well locations. Direct all drilling and sampling operations and maintain a detailed log of the conditions and materials penetrated during the course of the work.

TABLE 1
LISTING OF SITES

SITE NO.	PHASE I NO.	SITE DESCRIPTION
1	D-1 (TAC)	Goose Dump 1
2	FT-1 and FT-2 (ANG)	Fire Training Areas
3	S-2 (ANG)	DPDO Storage Area "C"
4	SP-1 (ANG)	Tank Para Area
5	D-4 (TAC)	South Goose Dump
6	D-2 (TAC)	Goose Dump 2
7	D-6 (TAC)	Runway 13 ME Disposal
8	S-1 (ANG)	Old DPDO Storage Area
9	D-9 (TAC)	Disposal Pit
10	RD-1 (ANG)	Low-Level Radioactive Waste Disposal

MOTE: ANG: Air National Guard sites TAC: Tactical Air Command sites

• *



- 3. Provide on site analysis of pH, temperature, and specific conductance for all water samples collected. Comply with the following references concerning sample collection, maximum holding time, sample preservation, etc: Standard Methods for the Examination of Water and Wastewater, 16th Ed. (1985), pp. 37-44; ASTM, Section 11, Water and Environmental Technology; Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057; Methods for Chemical Analysis of Waters and Wastes, EPA Manual 600/4-79-020, pp. xiii to xix (1983); and Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 2nd Ed. (USEPA, 1984). Meet the required detection limits of the applicable EPA method identified in Table 4 for all water and soil chemical analyses.
 - 4. Determine the areal extent of the sites by reviewing available aerial photos of the base, both historical and the most recent panchromatic and infrared. Report the sources of this data.
 - 5. Split all water and soil samples. One set of samples shall be analyzed by the contractor and the other set of samples shall be delivered immediately (the same collection day) to the field government Point Of Contact (POC). The field POC will select 10% of the split samples for subsequent shipment and analysis and deliver them to the contractor within 24 hours of receipt. The contractor shall supply all packing and shipping materials for the field POC's use in packaging the split samples. The contractor shall accept from the field POC the packaged samples for immediate shipment (within 24 hours) for analysis through overnight delivery to:

USAFOEHL/SA Bldg 140 Brooks AFB TX 78235-5501

Include the following information with samples sent to the USAF OEHL:

- a. Purpose of sample (analyte)
- b. Installation name (Base)
- c. Sample number (on container)
- d. Source/location of sample
- e. Contract Tas.: Numbers and Title of Project
- f. Method of collection (bailer, suction pump, air-lift pump, etc)
- g. Volumes removed before sample taken
- h. Special Conditions (use of surrogate standard, etc.)
- i. Preservatives used (indicate if nonstandard)
- j. Date and time of sampling
- k. Sampler's name

Forward this information with each sample by properly completing an AF

Form 2752A "Environmental Sampling Data" and/or AF Form 2752B "Environmental Sampling Data-Trace Organics," mailed under separate cover. Label each sample container to reflect the data in (a), (b), (c), (i), (j), and (k) above. In addition, attach copies of field logs which document sample collection.

Complete and maintain chain-of-custody records for all samples, field blanks, and quality control duplicates.

- 6. Install groundwater monitor wells using the following specifications:
- a. Comply with the U.S. EPA Publication 330/9-S1-002, NEIC Manual for Ground Water /Subsurface Investigations at Hazardous Waste Sites for monitor well installation. Also comply with state and local regulatory agency requirements concerning well drilling, development and purging, and groundwater sampling methods.
- b. Drill each well using conventional hollow-stem auger techniques. Where refusal is encountered due to boulders before the required well completion depth is achieved, use diamond core drilling to complete the borehole. Take samples for stratigraphic description and logging at five-foot intervals using standard split spoon techniques. Include each pilot boring log and well completion summary in the Final Report (as specified in Item VI below).
- c. Collect soil samples for laboratory analysis from well boreholes as directed in section B. Where the depths and/or boreholes from which soil samples should be collected at a site are not specified in Section B, actual sample locations (borehole and depth) are at the field supervisor's discretion; however, samples should be limited to areas of suspected contamination. At sites where soil samples are specified in Section B to be collected from designated boreholes and at certain depths, variations may occur at the field supervisors discretion to ensure zones of suspected contamination are sampled. Do not collect or analyze more soil samples than authorized in Section B.
- d. Install wells at a sufficient depth to collect samples representative of aquifer quality and to intercept floating contaminants. Develop each well as soon as practical after completion by surging with an air-lift pump or bailer. Do not introduce foreign materials into the well during development. Continue well development until the discharge water is clear and free of sediment to the fullest extent possible, and the pH, temperature and specific conductance have stablized.
- e. Construct a maximum of 30 wells using two-inch inside diameter, stainless steel casing. Use threaded screw-type joints only. Flush thread all connections. Screen 15 feet in each well using two-inch diameter stainless steel casing with up to 0.010 inch slots. Well screening should extend ten feet into the aquifer and five feet above the water table to collect floating contaminants and allow for yearly fluctuations in the water table; however, this may not alway be possible due to site-specific groundwater conditions. Do not extend well screens to the ground surface, a minimum two foot bentonite or cement grout seal is required above all well screens, see paragraph 6.g. below. Cap the bottom of the screen. Well installation shall not exceed 1000 linear feet.
- f. Should a confining layer below the saturated zone be encountered while attempting to drill deep enough to install 15 feet of

screen, grout the hole in the confining layer to prevent potential contaminant migration and screen the well above the confining layer.

- g. Once the casing is installed, remove the augers and allow the soil formation to collapse around the well screen. Supplement the natural gravel pack with washed and bagged rounded sand or gravel with a grain size distribution compatible with the screen and formation. Place the gravel pack from the bottom of the borehole to two feet above the top of the screen. Tremie a granulated, pelletized, or slurry bentonite seal above the gravel/sand pack. Install the bentonite to a minimum thickness of two feet, and ensure a complete seal forms. Place Type I Portland cement grout from the bentonite seal to the land surface.
- h. Complete the wells by extending the well casing a minimum of two feet above land surface. The height of the casing riser must take into account standing surface water depths during the wet season to prevent surface waters from cascading down the well casing. Provide an end-plug or casing cap for each well. Shield the extended stainless steel with a steel guard pipe which is placed over the casing and cap, and seated in a 16-inch by 16-inch by 4-inch concrete surface pad. Slope the pad away from the well casing. Install a lockable cap or lid on the steel guard pipe. Install three four-inch diameter steel guard posts if the base determines the well is in an area which needs such protection. The guard posts shall each be eight feet in total length and installed radially from each wellhead. Recess the guard posts approximately four feet into the ground and insure they are removable to facilitate access for sampling pump installation. Paint the protective steel pipe and clearly number the well on the sleeve exterior.
- i. Determine by survey the elevation at the top of the casing of all newly installed monitor wells to an accuracy of 0.01 feet with respect to a base bench mark. Horizontally locate the new wells to an accuracy of 1.0 feet and record the position on both project and site specific maps. Bench marks must have previously been established from and are traceable to a USCGS/USGS survey marker.
- j. Measure water levels at all monitor wells as feet below the ground surface or below the top of casing elevation to the nearest 0.01 feet. Report in terms of mean sea level. Measure static water levels in the wells prior to sampling and at well development. After the wells have recovered from water sample collection. measure water levels to confirm previous measurements.
- 7. Allow wells to stabilize after development for a minimum of 24 hours prior to sampling. Purge wells prior to sampling until a minimum of three well volumes of water have been displaced and the pH, temperature, specific conductance, color, and odor of the discharge have stablized. Use a stainless steel or teflon bailer, or air-lift pump to purge wells. Sample using a bottom-discharge Teflon bailer.
- 8. If the well(s) cannot be sampled due to well development, well characteristics, or other reason(s), indicate the reason(s) in the report specified in Item VI.
- 9. Collect and analyze one round of water samples from all groundwater monitor wells. During sample collection from all wells, examine the surface of the water table for the presence of hydrocarbons and, if applicable, measure the thickness of the hydrocarbon layer.

10. Soil Borings

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- a. Conduct 19 soil borings not to exceed a maximum of 250 linear feet. The average estimated boring depth is ten feet except where noted in Section B. Accomplish the borings using hollow-stem auger techniques. Obtain samples using ASTM Method D-1526.
- b. During the boring operations, take samples at two and one-half foot intervals to develop lithographic descriptions and stratigraphic logs. Monitor the auger cuttings for signs of changing formations. Place special emphasis on field identification of contaminated soils encountered.
- c. Scan all soil samples with a photoionization meter or equivalent organic vapor detector. Include monitoring results in the boring logs.
- d. Whenever possible, measure water levels in all boreholes after the water level has stabilized.
- e. Grout all boreholes to the surface. It is especially important to ensure that they be adequately resealed to preclude future migration of contaminants.
- f. Permanently mark each location where soil borings are drilled. Record the location on a site specific map.
- 11. Collect pond sediment samples using a drop corer device or an Ekman dredge. Obtain surface soil samples using a stainless steel spoon or spade. Decontamination procedures outlined below are applicable.
- 12. Analyze water and soil samples collected as specified in Section B for those parameters summarized in Table 2. Laboratories conducting the analyses of samples must be certified as required by state or other regulatory agency standards as applicable in the State of Minnesota. The required detection limits and methods for these analyses are delineated in Table 4. Maintain all raw laboratory data for a minimum of five years after project completion and provide raw data to the USAFOEHL upon request.
- analytical technique--EPA Methods 601, 602, 608, 615, 8010, 8020, 8080, 8150--require positive confirmation of identity for all analytes having concentrations higher than the Method Detection Limit (MDL). This positive confirmation shall be conducted by second-column GC; however, gas chromatography/mass spectroscopy (GC/MS) can be used for positive confirmation if the quantity of each analyte to be confirmed is above the detection level of the GC/MS instrument. Analytes which cannot be confirmed will be reported as "Not Detected" in the body of the report, but the results of all second-column GC or GC/MS confirmational analyses are to be included in the report appendix along with other raw analytical data. Quantification of confirmed analytes will be based upon the first column analysis. The maximum number of confirmational analyses that will be funded under this delivery order is fifty percent (50%) of actual field samples. The total number of samples for each GC method listed in Table 2 includes this allowance.
 - 14. Analyze an additional 15% of all sample parameters for quality

control purposes. Field blanks must be an integral part of the quality control program. Provide all quality control sample analysis results in the report.

- 15. Plot and map all field data collected for each site according to surveyed positions. Identify or estimate the nature of contamination, its magnitude, and the potential for contaminant flow to receiving streams and ground water.
- 16. Remove all borehole cuttings and clean the general area following the completion of each well and boring. Properly containerize cuttings suspected of being contaminated (based on discoloration, odor or organic vapor detection instrument). Test the suspected contaminated waste for EP Toxicity and Ignitibility. The contractor shall be responsible for transporting drums containing suspected contaminated soils. The contractor shall be responsible for the ultimate disposal of contaminated soils in accordance with current Federal, State, and/or local hazardous waste disposal laws. The contractor shall provide a final, completed copy of the hazardous waste manifest document to the HQ TAC/SGPB point of contact referenced in paragraph V for those borehole cuttings obtained from TAC sites (Sites 1, 5, 6, 7, and 9) and to the ANGSC/SGB point of contact referenced in paragraph V for those borehole cuttings obtained from ANG sites (Sites 2, 3, 4, 8, and 10).
- 17. Decontaminate all sampling and well purging equipment prior to use and between samples to avoid cross contamination. As a minimum, wash equipment with a laboratory-grade detergent followed by a distilled water rinse, repeating the rinsing procedure two more times. Where field conditions warrant, follow the laboratory-grade detergent wash with a hexane rinse, rinse with distilled water, and finally wash with dilute nitric acid and rinse again with distilled water. Allow sufficient time for the solvent to evaporate and for the equipment to dry completely. The calibrated water level indicator for measuring well volume and fluid elevation must be decontaminated before use in each well.
- 18. Thoroughly clean and decontaminate the drilling rig and tools before initial use and after each borehole completion. As a minimum, steam clean drill bits after each borehole is installed. Drill from the <u>least</u> to the most contaminated areas, if possible.
- 19. Evaluate available techniques for well abandonment that are applicable to the type of monitor wells and geological conditions at Duluth IAP. Consider that these wells will be abandoned at some future date after the study objectives have been met and they are no longer needed. Recommend a candidate abandonment method or technique, including costs. Ensure abandonment techniques comply with state and local rules. The actual process of well abandonment is not part of this study.
- 20. Perform an inventory of all on-base wells, to include production, irrigation, abandoned, monitoring, etc.
- 21. Conduct a literature search of local hydrogeologic conditions to complement the Phase I and Phase II Reports. Use this data to determine optimum well locations. Include the pertinent literature search information in Appendix D of the Final Report. Develop the literature search data using the following guideline:
 - a. Topographic data

- b. Geologic data
 - (1) Structure
 - (2) Stratigraphy
 - (3) Lithology

c. Hydrologic data

- (1) Location of existing wells, observation holes and springs within a one-mile radius of sites to be investigated.
 - (2) Groundwater table and piezometric contours
 - (3) Depth to water
 - (4) Quality of water
- d. Data on existing wells, observation holes, and springs within a one-mile radius of sites to be investigated.
- (1) Location, depth, diameter, types of wells, and construction logs
- (2) Static and pumping water level, hydrographs, yield, specific capacity, and quality of water
- (3) Present and projected groundwater development and anticipated use
 (4) Corrosion, incrustation, well interference, and similar operation and maintenance problems
- (5) Location, type, geologic setting, and hydrographs of springs
 - (6) Observation well networks
 - (7) Existing water sampling sites

e. Aquifer data

- (1) Type, such as unconfined, artesian, or perched
- (2) Thickness, depth, and formation designation
- (3) Boundaries
- (4) Transmissivity, storativity, and permeability
- (5) Specific retention
- (6) Discharge and recharge
- (7) Ground and surface water relationships
- (8) Aquifer models

f. Climatic data

(1) Precipitation

(2) Evapotranspiration

B. In addition to the general items delineated in A above, conduct the following specific actions at the sites identified in Table 1 and Figure 1 (required analytical parameters are listed in Table 2):

1. Site 1 (TAC) - Goose Dump 1(D-1)

- a. Drill and construct a maximum of four monitor wells. Position three of the wells at the site perimeter consistent with the assumed downgradient direction of groundwater flow. To collect ambient water quality information, place the fourth well outside the site perimeter consistent with the assumed upgradient direction of groundwater flow. Collect one groundwater sample from each monitor well. During the borehole drilling collect a maximum of four soil samples for laboratory analysis, see I.A.6.c.
- b. Drill one soil boring in the suspected zone of contaminatio and collect soil samples from the ground surface and at each two and one-hal foot interval until the estimated final borehole depth of ten feet is reache. Analyze the samples from the surface and at the two and one-half and five foot depths.
- c. Designate two sampling points from surface waters located a the site, or from surface waters adjacent to and downstream of the site.
- d. Collect both a water sample and a bottom sediment sample from each of these surface water sample points.
- e. Analyze all water and soil samples for volatile organic as a romatic compounds (VOA), oil and grease (O&G), pesticides/herbicides (P/H), polychlorinated biphenyls (PCBs), phenols and metals.

2. Site 2 (ANG) - Fire Training Areas 1 and 2 (FT-1 and FT-2)

- a. Drill and construct a maximum of five monitor wells. Position one well consistent with the assumed upgradient direction of groundwater flow. Use information from this well to establish ambient water quality. Place four wells in the assumed downgradient direction of groundwater flow; two between FT-1 and FT-2 on either side of the access road and two north of FT-2. Collect one groundwater sample from each monitor well. During the borehole drilling, collect a maximum of five soil samples for laboratory analysis, see I.A.6.c.
- b. Drill two soil borings in FT-1 and one soil boring in FT-2. Locate each boring in the center of a burn pit. If the second and older burn pit in FT-1 cannot be defined through aerial photographs or a physical site inspection, only drill one boring in FT-1. Collect soil samples from the ground surface and at each two and one-half foot interval until the estimated final borehole depth of ten feet is reached. Analyze the samples from the ground surface and the two and one-half and five foot depths.
- c. Designate sampling points in the drainageway between the western extension of the access road and the southwestern boundry of site FT-2. Collect two surface water samples and two bottom sediment samples from this drainageway.
 - d. Collect one surface sediment sample and one surface water

sample from the swamp to the north and downgradient of FT-2.

- e. Collect one round of groundwater samples from the six existing monitor wells at these sites.
 - f. Analyze all water and soil samples for VOA, O&G and phenols.

3. Site 3 (ANG) - DPDO Storage Area "C" (S-2)

- a. Drill and construct a maximum of four monitor wells. The positioning, and soil and water sampling follows that specified at Site 1, para B.1.a.
- b. Drill three soil borings positioned along a center-line running north to south in the storage area. Follow the soil sampling plan specified at Site 1, para B.1.b.
- c. Designate sampling points in the drainageway which begins on the east side of the storage area and then heads in a northwesterly direction. Collect three surface water samples and three bottom sediment samples from this drainageway. Collect the first sediment and water sample in the approximate location of Sample 2 identified in the Stage 1 study. Subsequent sample points should be at 100 foot intervals downgradient along the drainageway.
- d. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

4. Site 4 (ANG) - Tank Farm Area (SP-1)

- a. Perform a geophysical survey using a metal detector and a magnetometer to precisely locate underground pipes. Perform an electromagnetic survey to identify leak sites from these pipes. Survey the entire tank farm to include a minimum 50 foot buffer around the site perimeter. Expand the geophysical survey on the southern side of the tank farm area to the main access road. A former fueling facility is located south of the tank farm.
- b. Drill and construct a maximum of four monitor wells. The well positioning, and soil and water sampling follows that specified at Site 1, para B.1.a.
- c. Drill five soil borings, position them based upon the geophysical survey result and the data generated during the Stage 1 study. Boring depth is estimated to be 15 feet; however, drill until the water table is reached. Collect soil samples at two and one-half foot intervals beginning at ground surface. Analyze the samples collected at two and one-half, five, and seven and one-half foot depths.
- d. Designate sample points in the drainageways/culverts around the site, of particular interest is the drainageway heading north to Beaver Creek. Collect four surface water and four sediment samples from the drainageways/culverts.
- e. Collect one round of groundwater samples from the four existing monitor wells at this site.
 - f. Analyze all water and soil samples for VOA and O&G.
 - 5. Site 5 (TAC) South Goose Dump (D-4)

- a. This site was originally designated D-4, South Goose Missle Site Dump, in the Phase I report and was not recommended for Phase II Stage? evaluation. However, during Phase II Stage 1, it was erroneously confused with D-1, Goose Missle Site Dump, which was recommended for Phase II Stage 1 monitoring. Consequently, this site was studied during the Phase II Stage 1 effort, but referenced as site D-1 throughout the report.
- b. Drill and construct three monitor wells. Position two of the wells approximatley 50 feet from the site perimeter and consistent with the assumed downgradient direction of groundwater flow. Place the other monitor well outside the site perimeter and consistent with the assumed upgradient direction of groundwater flow so as to collect ambient water quality information. Collect one groundwater sample from each monitor well. During the borehole drilling, collect a maximum of three soil samples for laboratory analysis, see I.A.6.c.
- c. Collect three surface water samples from the pond/swamp at this site.
- d. Collect a maximum of five sediment samples from the bottom of the pond/swamp area and drainageways which exit this site.
- e. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

6. Site 6 (TAC) - Goose Dump 2 (D-2)

- a. Perform a geophysical survey using a metal detector and a magnetometer to locate the dump site drums. Also conduct a detailed examination of available aerial photographs for the same purpose.
- b. If the geophysical survey and aerial photographs cannot locate the drums and accurately define the site location, perform no more wor:
- c. If the site can be located, drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at two and one-half foot intervals until the estimated final borehole depth of ten feet is reached. Analyze the samples from the surface and at two and one-half feet for ethylene glycol, O&G and VOA.

7. Site 7 (TAC) - Runway 13 NE Disposal (D-6)

- a. Perform a geophysical survey using a metal detector and magnetometer to define as accurately as possible the site boundaries. Also conduct a detailed examination of available aerial photographs for the same purpose.
- b. Drill and construct three monitor wells. The positioning, and soil and water sampling follows that specified at Site 5, B.5.b.
- c. Drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at two and one-half foot intervals until the estimated final borehole depth of ten feet is reached. Analyze the samples from the surface and at the two and one-half foot depth.
 - d. If surface drainage from the site can be located, collect

one each bottom sediment and surface water sample outside, but within 20 feet, of the site boundry.

e. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

8. Site 8 (ANG) - Old DPDO Storage Area (S-1)

- a. Drill and construct three monitor wells. The positioning, and soil and water sampling follows that specified at Site 5, B.5.b.
- b. Drill two exploratory soil borings, one in the center of each of the two former storage area sites. The soil sampling plan follows that specified at Site 1, B.1.b.
- c. Collect two surface water and two bottom sediment samples from drainageways at points downstream of the site.
- d. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

9. Site 9 (TAC) - Disposal Pit (D-9)

- a. Perform a geophysical survey using a metal detector and a magnetometer to locate the site. Also conduct a detailed examination of available aerial photographs for the same purpose.
- b. If the geophysical survey and aerial photographs cannot accurately define the site location, perform no more work.
- c. If the site can be located, drill one exploratory soil boring in the zone of contamination. Collect soil samples at two and one-half foot intervals and analyze the samples at two and one-half feet above and below the water table.
- d. If the site can be located, drill and construct one monitor well at the site perimeter consistent with the assumed downgradient direction of groundwater flow. Collect one groundwater sample.
- e. Analyze all water and soil samples for acetone and picric acid.

10. Site 10 (ANG) - Low-Level Radioactive Waste Disposal (RD-1)

- a. Conduct a geophysical survey (metal detector and magnetometer) and review aerial photographs to accurately locate the site.
- b. Drill and construct three monitor wells. Position two of the wells at the site perimeter consistent with the assumed downgradient direction of groundwater flow. Place the third well in the assumed upgradient direction of groundwater flow to collect ambient water quality information. Do not analyze soil samples from these boreholes.
- c. Collect one groundwater sample from each well and analyze them for gross alpha, gross beta, radium 226 and radium 228.

C. Field Coordination

Notify the Air Force POC's (see section V) at the USAFOEHL and Duluth IAP at least five days in advance of water sample collection dates.

D. Technical Field Operations Plan

Develop a detailed field operations plan based upon the technical requirements specified in this task description for the proposed work effort. Be explicit with regards to field procedures. Include, but do not limit the plan to, field decontamination operations, sampling protocol, QA/QC field procedures, field schedule, etc. A guideline for the plan is provided under separate cover. Reference paragraph VI, Sequence No. 2.

E. Health and Safety

Comply with all applicable USAF, OSHA, EPA, state and local health and safety regulations regarding the proposed work effort. Use EPA guidelines for designating the appropriate levels of personnal protection at study sites. Prepare a written Health and Safety Plan for the proposed work effort and coordinate it directly with regulatory agencies where required. Provide an information copy of the Health and Safety Plan to the USAFOEHL prior to commencing field operations (i.e., drilling and sampling). (Reference paragraph VI, Sequence No. 7)

F. Data Review

- l. Tabulate field and analytical laboratory results (including quality control data), and incorporate them into the monthly R&D Status Reports. Forward them to the USAFOEHL for review as soon as they become available as specified in Item VI below. In addition to the results, report the dates of sample collection, extraction (if applicable) and analysis.
- 2. Upon completion of all analyses, tabulate and incorporate all results into an Informal Technical Information Report (Atch 1, Seq 3 as specified in the contract and in Item VI below) and forward the report to the USAFOEHL for review.
- 3. Immediately report to the USAFOEHL Program Manager via telephone, data/results generated during this investigation which indicate a potential health risk (for example, a contaminated drinking water aquifer).

G. Reporting

- 1. Prepare two draft reports following the USAFOEHL-supplied report format (mailed under separate cover). One report shall delineate the findings for the TAC sites (Sites 1, 5, 6, 7, and 9). The second report shall detail the findings at the ANG sites (Sites 2, 3, 4, 8, and 10). Forward the reports to the USAFOEHL (as specified in item VI below) for Air Force review and comment.
- 2. Review the results, conclusions and recommendations from previous IRP investigations which concern the sites listed in this task. Integrate all investigative work done at each site to date so the report reflects the total available information for each site. Use this cumulative information and data to establish trends and develop conclusions and recommendations.

- 3. Include in this report a discussion of regional/site-specific hydrogeology, well and borings logs, data from water level surveys, groundwater surface and gradient maps, and available hydrogeologic cross sections and geophysical survey data.
- 4. In the results section, include water and soil analysis results, field quality control sample data (field blanks, duplicates, etc.), internal laboratory quality control data (lab blands, lab spikes, and lab duplicates), and laboratory quality assurance information. Provide second-column confirmation results and include which columns were used, the conditions existing and retention times.
- 5. Make estimates of the magnitude, extent and direction in which detected contaminants are moving. Identify potential environmental consequences of discovered contamination based upon State and/or Federal standards.
- 6. Summarize the specific collection techniques, analytical method holding time and limit of detection used for each analyte (Standard Methods, EPA, ASTM, etc.).
- 7. In the recommendation section, address each site and list them by category. Category I consists of sites where no further action, including remedial action, is required. Data for these sites are considered sufficient to rule out unacceptable health or environmental risks. Category II sites are those requiring additional investigation to quantify or further assess the extent of current or future contamination. Category III denotes sites that will require remedial action (ready for IRP Phase IV). In the recommendations for Category III sites, include any possible influence on sites in Categories I and/or II due to their connection to the same hydrological system. Clearly state any dependency between sites in different categories. Include a list of candidate remedial action alternatives, including Long Term Monitoring (LTM) as remedial action, and the corresponding rationale that should be considered in selecting the remedial action for a given site. List all alternatives that could potentially bring the site into compliance with environmental standards. For contaminants that do not have standards, EPA recommended safe levels for non-carcinogens (Health Advisory or Suggested-No-Adverse-Response Levels) and target levels for carcinogens (1 x 10 cancer risk level) may be used. If not specifically requested, do not include a comprehensive cost or technical analyses of alternatives. However, in those situations where field survey data indicate immediate corrective action is necessary, present specific, detailed recommendations. For each category above, summarize the results of field data, environmental or regulatory criteria, or other pertinent information supporting conclusions and recommendations.
- 8. For those sites needing additional Phase II study, identify specific requirements, if any, for future monitoring. Identify potential environmental consequences of contamination. Provide estimates of costs by line items for additional investigations beyond this stage along with estimates of time required to accomplish the investigation. Furnish the cost data in a separately bound appendix to the final report. (Reference paragraph VI, Sequence No. 2)
- 9. Provide an inventory of all on-base wells, to include production, irrigation, abandoned, monitoring, etc.
- 10. Include in an appendix to the report the names of all local, state or other regulatory personnel and the dates they approved well

drilling, development and purging techniques, well materials, and sampling methods. All well drilling, development, purging, and sampling must conform to State and local regulatory agency requirements.

11. Provide the candidate well abandonment techniques and the recommended techniques most appropriate for Duluth IAP.

H. Meetings

The contractors project leader shall attend two meetings to take place at a time to be specified by the USAF OEHL. Each meeting shall take place at Duluth IAP for a duration of one day (eight hours).

II. SITE LOCATION AND DATES

Duluth IAP MN
Date to be established

III. BASE SUPPORT

- A. Prior to any contractor digging or drilling, locate underground utilities and issue digging permits.
 - B. Provide access to the Phase II Stage 1 monitoring wells.
- C. Provide the contractor with existing engineering plans, drawings, diagrams, aerial photographs, etc., as needed to evaluate sites under investigation.
- D. The base Point Of Contact shall receive from the contractor the split samples, select 10% of them, package them, and then deliver them back to the contractor within 24 hours for subsequent overnight shipment to USAFOEHL/SA as stated in paragraph I.A.5.
 - E. Provide contractor with a secure staging area for storing equipment and supplies.
 - F. Provide a paved area where drilling equipment can be cleaned and decontaminated.
 - G. Base Civil Engineer will prepare and sign any hazardous waste manifest documentation resulting from this effort.
- H. Base will store any drums containing suspected hazardous waste until determined to be hazardous/non-hazardous.
- IV. GOVERNMENT FURNISHED PROPERTY: None
- V. GOVERNMENT POINTS OF CONTACT:
 - 1. 2Lt Gary Woodrum USAFOEHL/TSS Brooks AFB TX 78235-5501 AV 240-2158 (512) 536-2158 1-800-821-4528

2. Col Jerry Dougherty HQ TAC/SGPB Langley AFB, VA 23665-5001 AV 432-5857 (804) 764-2180

GRAGE

- 3. Lt Col Michael Washeleski ANGSC/SGB Andrews AFB, MD 20331-6008 AV 858-3443/5926 (301) 981-5926
- 4. Sgt Suzanne Schlies
 148 TAC Clinic
 Duluth IAP MN 55811-5000
 AV 825-7223
 (218) 723-7224

VI. In addition to sequence numbers 1, 5 and 11 listed in Attachment 1 to the contract, and which apply to all orders, the sequence numbers listed below are applicable to this order. Also shown are dates applicable to this order.

Seq. No.	Para. No.	Block 10	Block 11	Block 12	Block 13	Block 14
19 محر	I.D. Techn. Op.	O/TIME	86 OCT 10	86 OCT 13		15
7	I.E.	O/TIME	86 OCT 10	86 OCT 13		3
3	I.F.1.	O/TIME	•	•		3
- 4	I.G.(TAC)	ONE/R	86 DEC 31	87 JAN 16	87 OCT 16	••
4	I.G.(ANG)	ONE/R	86 DEC 31	87 JAN 16	87 OCT 16	••
2	1.G.8.	O/TIME	87 Jan 16	87 OCT 16		•••
14		MONTHLY	86 OCT 27	86 NOV 11		
15		MONTHLY	· 86 OCT 27	86 NOV 11		

- Upon completion of the analytical effort and prior to submission of the first draft report.
- Incorporate Air Force comments into the second draft and final report as specified by the USAF OEHL. Supply the USAFOEHL with a single copy of the first draft, second draft, and final reports for acceptance prior to distribution. Distribute all report copies as specified by the USAFOEHL. Supply 25 copies of each draft report and 50 copies plus the original camera ready copy of the final report. Distribute the remaining 24 copies of each draft report and 49 copies of the final report as specified by the USAFOEHL.
- Submit cost estimates (five copies) in a separately bound document with the final report only. Provide estimates for only those sites recommended for additional Phase II work (Category II) or Phase IV, long-term monitoring (Category III).

TABLE 2

SAMPLING AND ANALYTICAL REQUIREMENTS

DULUTH IAP

Analyte Me													(10)	
					SITE	SITE NUMBERS	ERS					3	Column	
	Medium	1	2	3	4	5	9	7		6	의	04 (3)	Confirmation TOTAL	TOTAL
	ater, (7)	9	14	7	12	9		4	S	•	•	6	30	93
	Soft (8)	6	12	16	ຮ	~	4	œ	===	•	•	15	53	164
	ater	9	14	7	12	9		4	ĸ	•		6	•	63
	Sofi	0	17	91	23	œ	4	œ	=======================================	•	ŧ	15	•	111
Metals (3) Wa	ster	9	•	7	,	9	•	4	ស	•	•	S	•	33
	Sofl	6	•	16	•	œ	•	œ	==	•	•	0	•	19
Pesticides/(4) Wa	ater	9	•	7	•	9	•	4	Ŋ	•	•	S	16	49
	Sofl	6	•	16	•	œ	•	Φ	Ξ	•	•	0	5 3	8
	ster	9		7	•	9	1	マ	25	•	•	50	16	49
	Sofl	6	•	16	•	&	•	∞	11	•	•	6	62	8
Phenol	ster	9	14	7	•	9		4	ro.	•	•	©	•	S
	Sofl	6	17	16	•	œ		&	11	•	•	11	•	8
Acetone	Water	•	•	•	•			1	•	-	•	-	•	8
	110	•	•	•	•	•	1	•	•	~	•	-	•	m
Picric Acid Wa	Water	•		•	•		•	•	•	-	•	-	•	~
)	1	ı	•			•	•	•	~		-	•	m
Ethylene Glycol So	Sofl	•	•	٠	•	1	4	•	•	ı	•	-	1	S
	Water	•	•	•	•	•		•	•	•	က	-	•	4
	Sof1 Cuttings	15	sam) fi	oles a	samples authorized fied by site		8 5 11	needed	- not	spec1	-	~	•	11
EP Igniti- Sor	Sof1 Cuttings	15	Samp	samples a fied by	authori y site	zed	2 S	needed	- not	not speci-	+	8	•	11
e fol	aing page)													

TABLE 2 (Continued)

- NOTES: (1) See Table 3.
 - (2) Use Method 3550 to extract oil and grease from soil.
 - (3) Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver
 - (4) See Table 5.
 - (5) Includes analysis for Gross Alpha, Gross Beta, Radium-226 and Radium-228.
 - (6) Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver
 - (7) Includes both well and surface water samples.
 - (8) Includes both borehole and sediment samples.
 - (9) QA is 15% of the basic sample load.
 - (10) Assumes 50\$ for Methods 601, 602, 608, 615, 8010, 8020, 8080 and 8150 will require second column confirmation.

TABLE 3

VOLATILE ORGANIC COMPOUNDS (VOA)

PURGEABLE HALOCARBONS EPA Methods 601 and SW 8010

Bromodichloromethane Bromoform Bromomethane Carbon tetrachloride Chlorobenzene Chloroethane 2-Chloroethylvinyl ether Chloroform Chloromethane Dibromochloromethane 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1.4-Dichlorobenzene Dichlorodifluoromethane 1.1-Dichloroethane 1,2-Dichloroethane 1.1-Dichloroethene trans-1,2-Dichloroethene 1,2-Dichloropropane 1.3-Dichloropropene trans-1,3-Dichloropropene Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene Trichlorofluoromethane Vinyl chloride

PURGEABLE AROMATICS EPA Methods 602 and SW 8020

Benzene
Chlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Ethylbenzene
Toluene

Also: Xylene

TABLE 4

ANALYTICAL PARAMETERS, METHODS AND REQUIRED DETECTION LIMITS

PARAMETER	METHOD	DETECTION LIMIT
Oil and Grease (Using IR)	EPA 413.2	20 µg/g soil ^a 1 mg/l water
Volatile Organic and Aromatic Compounds (VOA)	EPA 601 and 602 SW 8010 and 8020	b b
EP Toxicity	D	c
Ignitibility	SW 1010	d
Pesticides and/or PCB	EPA 608 SW 3550 and 8080	e 1 µg/g soil
Herbicides	EPA 615 SW 8150	e 1 µg/g soil
Phenol	EPA 420.2	5 μg/l water 5 μg/g soil
Metals		
Arsenic f	EPA 206.2 SW 3050 and 706	10 μg/l water 1 μg/g soil
Barium ^f	EPA 208.2 SW 3050 and 6010	200 µg/l water 20 µg/g soil
Cadmium f	EPA 213.2 SW 3050 and 6010	10 μg/l water 1 μg/g soil
Chromium f	EPA 218.1 SW 3050 and 6010	50 µg/l water 5 µg/g soil
Lead f	EPA 239.2 SW 3050 and 6010	20 µg/l water 2 µg/g soil
Mercury f	EPA 245.1 SW 7471	1.0 µg/l water 0.1 µg/g soil
Selenium ^f	EPA 270.3 SW 3050 and 7740	10 µg/l water 1 µg/g soil
Silver f	EPA 272.2 SW 3050 and 6010	10 µg/l water 1 µg/g soil

TABEL 4 (Continued)

PARAMETER	METHOD	DETECTION LIMIT
Acetone	ASTM D 3695-82	÷
Picric Acid	USATHAMA 2B	4
Ethylene Glycol	NIOSH P & CAM 338 Modified for Soil	-
Gross Alpha	Standard Methods: 15th ed, 703	-
Gross Beta	Standard Methods: 15th ed, 703	-
Radium∺226	EPA 600/4-80-032, 903.0	-
Radium-228	EPA 600/4-80-032, 904.0)

TABLE 4 (Continued)

Based on extracting 50 grams of soil and 100 ml final extract volume.

Detection limits for Purgeable Organics and Aromatics shall be as specified for the compounds by EPA Methods 601-602. Method: Federal Register, Vol. 44, including these items:

- Item 1.4 This method is recommended by EPA for use only by experienced residue analysts or under the close supervision of such qualified persons.
- Item 2.2 This is most important. If interferences are encountered (as in early peaks such as vinyl chloride), the method provides a secondary chromatographic column that will be helpful in resolving the compounds of interest from interferences. This must be done in the case of vinyl chloride and so noted in the analysis report.
- Items 3.3, 7.1-7.3 These sections must be analyzed within the recommended holding times.
- Item 8.3 All samples must be analyzed within the recommended holding times. This must be followed without exception.

If questions are encountered about certain contaminants, you may be asked to show both chromatograms used to rule out possible interferences.

C	Metals	μg/l of Extract
	As	0.053
	Ba	0.1
	Ca	0.005
	Cr	0.05
	Pb	0.1 0.0002
	Hg Se	0.075
	Ag	0.01

dfind if sample is ignitable at 140 degrees Fahrenheit or below. If so, it is a hazardous waste.

eMethod Detection Limit

Primary Drinking Water Standard, 40 CFR 141.11

TABLE 5

Pesticides and PCBs - EPA Methods 608 and SW 8080

aldrin	a5BHS
dieldrin	b∺BHC
chlordane	gr:BHC
4.4°-DDT	w-BHC
4.4'ADDE	PCB=1242
4.4°-DDD	PCB-1254
arendosulfan	PCB-1221
b-endosulfan	PCB-1232
endosulfan sulfate	PCB-1248
endrin	PCB-1260
endrin aldehyde	PCB=1016
heptachlor	toxaphene
heptachlor epoxide	•

Herbicides - EPA Method 615 and SW 8150

2,4-D

2,4,54T

2,4,5-TP (Silvex)